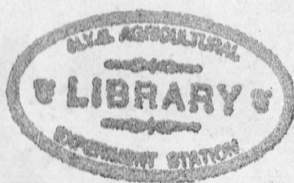


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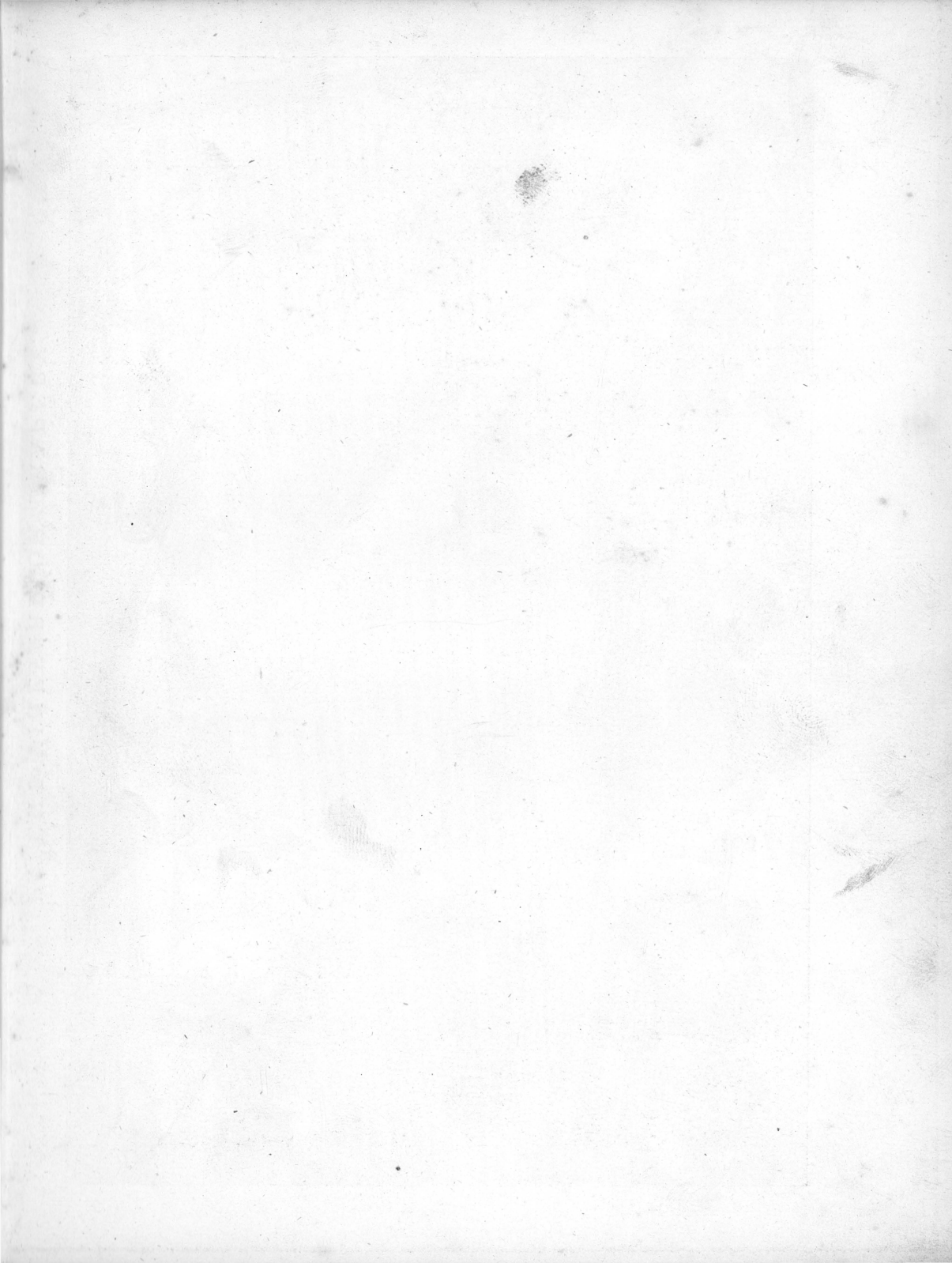
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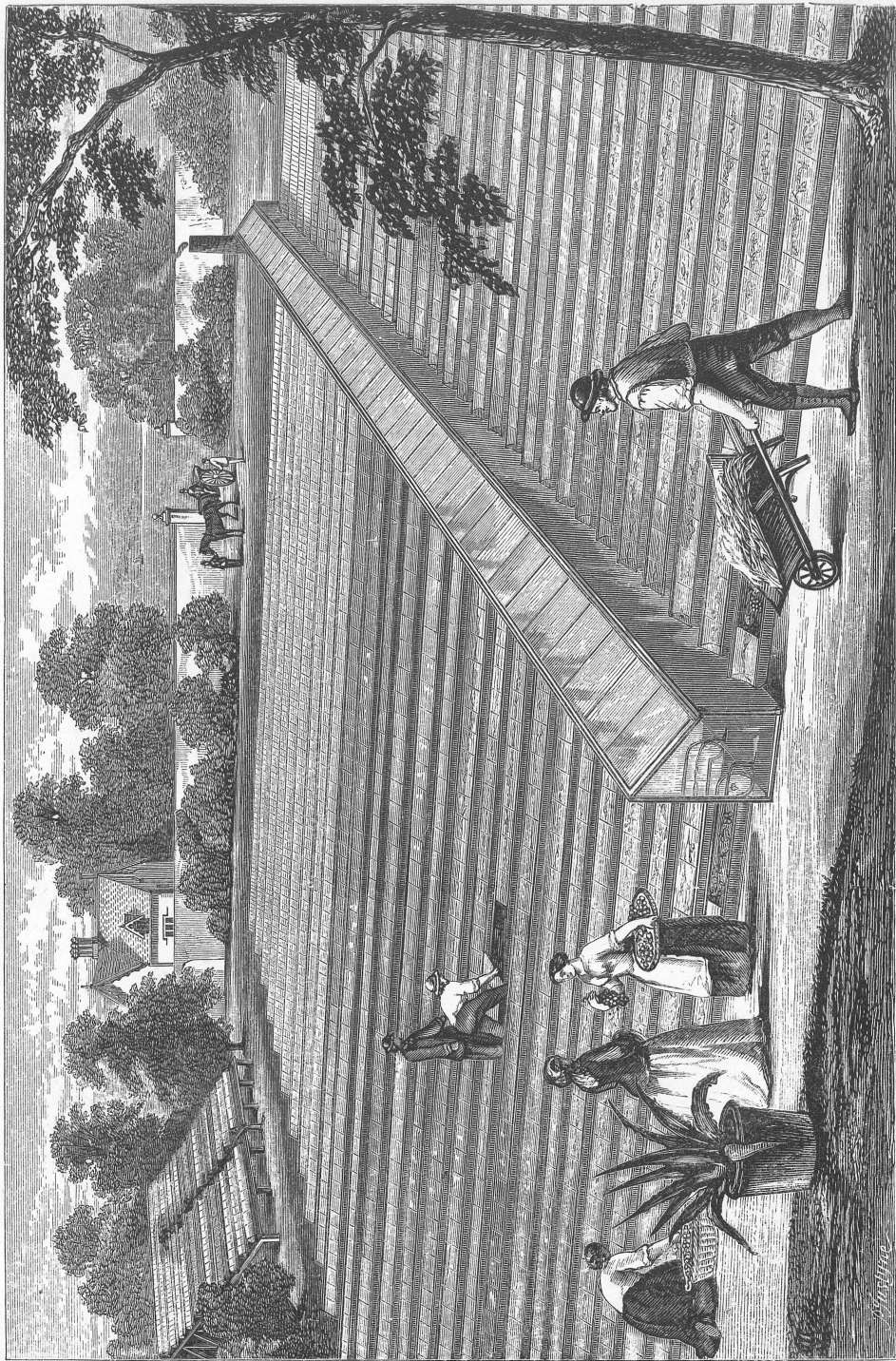


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PATENT VINEYARD OR GRAPERY.

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BEING

A TREATISE

ON THE

NEW PATENT FRUIT-TREE

AND

PLANT PROTECTORS.

BY

WILLIAM EDGCUMBE RENDLE,

Inventor of the Tank System of Heating Horticultural Buildings, &c.

LONDON:

W. ALLAN & CO., STATIONERS' HALL COURT.

1868.

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LONDON :

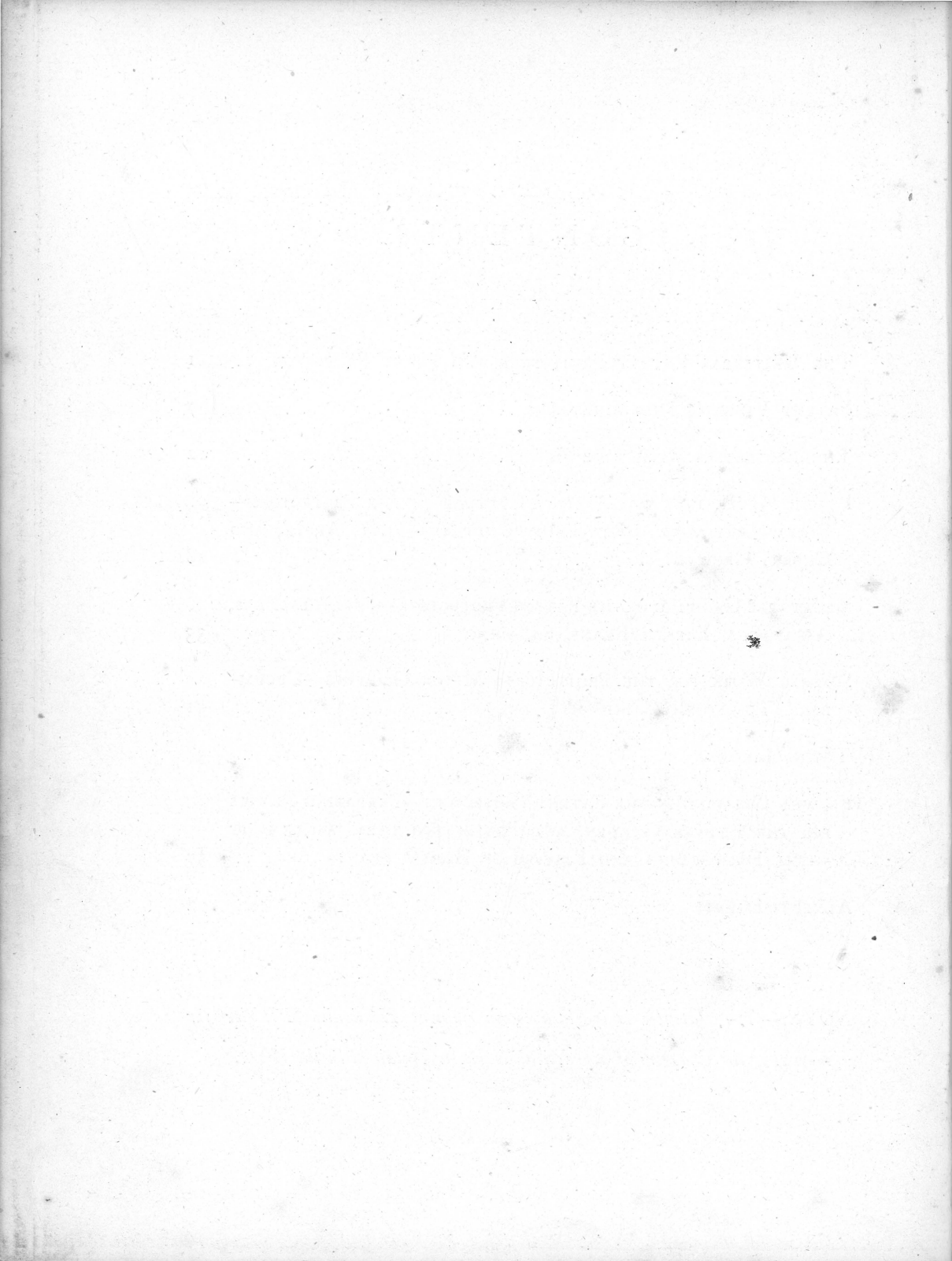
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ALDERSGATE STREET, E.C.

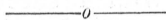
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NOTE.—The Patentee is indebted to an eminent Horticultural Writer for several of the Chapters of a practical character contained in the Work.



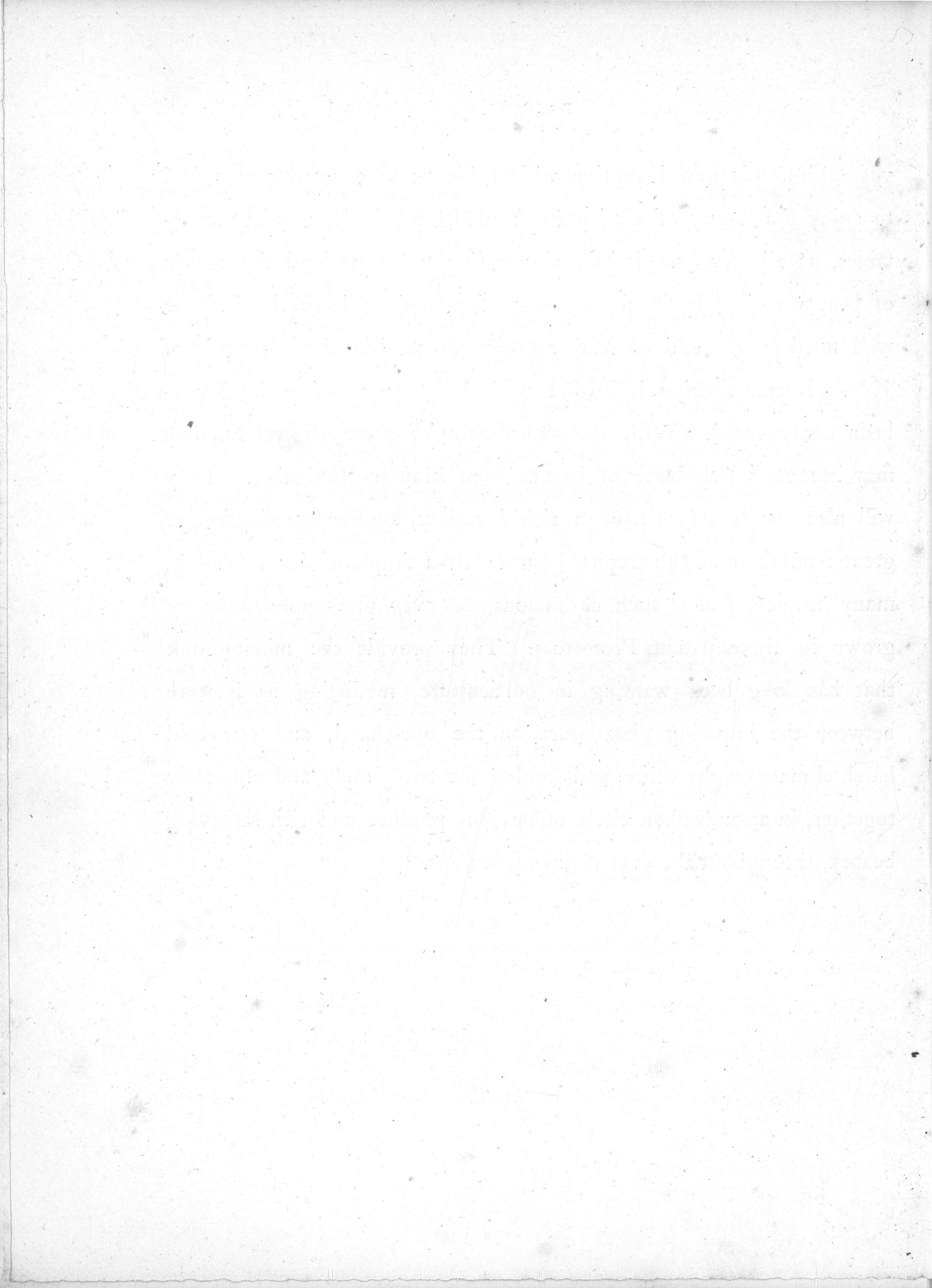
PREFACE.



LITTLE need be said here in reference to the contrivances illustrated and described in the following pages, which it is hoped will be found to contain much that is both useful and interesting. Sufficient protection against cold, without the heavy expenses of the building and constant repairs of ordinary hothouses, is the boon that these Protectors bring within the reach of all classes. Hitherto, structural cost has acted as a barrier to the general employment of glass as an ameliorator of our fickle climate, and a virtual extender of the summer season. By prolonging the reign of summer, and securing its constancy while with us, we create as it were a new climate. Our enterprise is great, our cultural skill probably the highest in the world, and yet how many are content to be baffled in all their gardening operations, and to have their hopes of success utterly crushed, by a few spring or autumn frosts! How is it that year after year our early flowers, fruit, and vegetables, are cut down before our eyes, and we hardly attempt to save them? The reason

is obvious. Many look upon the building of glass-houses as the first step to ruin. They would like above all things early and late produce, and fruit of the highest quality, at all seasons, but the expense frightens them. But it need no longer do so. Sufficient protection may be secured with a sheet of glass, a common drain-tile, and a handful of hay, to grow all our best fruits to the highest perfection. At last, then, the great boon of cheap glass is likely to be turned to the best account. Without any expensive buildings the finest fruits may be grown. How this is to be done it will be the purport of the following pages to explain. By extending the summer season—at both ends—that season will become long and genial enough to ripen grapes in the open air over the greater part of England. The warmth of the earthenware houses, and the attractive power of the clear glass, will afford heat enough to ripen the grapes without fire-heat. The fruit will also ripen in conveniently small quantities, so that it may always be eaten fresh; and by the use of fire-heat one or more grape-vines may be ripened every week all the year round. Tender fruits, such as Peaches, Nectarines, Apricots, Plums, Cherries, and the choicest Apples, Pears, and Strawberries, will be carried safely through the period of spring frosts, and plentiful crops of the finest quality obtained. Instead of depending, as we do now, to a great extent, on the Continent for

vegetables, this new invention will enable us to grow our own, and to enjoy the luxury of a crisp Lent salad, and fresh succulent vegetables, at all seasons. It will also enable us to prolong the season of beauty and glory in the flower-garden, and to have the beds as well filled in the end of May as they are now in the latter part of July. In cold districts it is often well-nigh autumn before the flower-beds are covered. With the skilful use of these Protectors, they may become a rich blaze of beauty from May to November. They will also enable us to have a richer variety, by the introduction of greater numbers of sub-tropical plants. By a simple mode of heating, many tropical fruits, such as melons, or even pine-apples, may be grown in these patent Protectors. They provide the missing link that has long been wanting in horticulture, mediating as it were between the imposing glass-house on the one hand, and our cold harsh climate on the other, and linking the two simply and efficiently together, in an unbroken circle of luscious produce and rich satisfying beauty, throughout the ever-recurring seasons.



A TREATISE
ON THE
NEW PATENT FRUIT-TREE AND PLANT
PROTECTORS.

THE UNIVERSAL PATENT FRUIT-TREE AND
PLANT PROTECTOR.

THE great essentials of these Protectors are cheapness, simplicity, portability, durability. They are cheap enough to come within reach of the million; so simple that everyone may use them; portable enough for anyone to carry them under their arm from one crop to another, and so durable as to last for several generations. They have the additional merits of blending in nicest proportions transparent and opaque substances in such a skilful manner as to ensure sufficient light, while husbanding as large a percentage of heat as possible for nightly use, when the light and heat of the sun are withdrawn. Thus they steer clear of the greatest evils incident to Protectors formed wholly of glass. The glass tends to roast vegetation in the daytime, and starves it by its active radiation or loss of heat at night. It fosters the evils of the two extremes of temperature; during sunshine exciting all the energies of growth to the utmost; at night paralyzing every vital function by the torpid grasp of intense cold.

Another great evil incident to the use of temporary Protectors formed wholly of glass is that they excite vegetation too early in the season. A few days' sunshine in, say the middle of February, acting upon a tree or plant through the glass, summons it into growth, and this tender growth will be assuredly destroyed before March is over, the glass Protector notwithstanding.

Paradoxical as it may seem, it is nevertheless true that Protectors early in the season are often more useful in hindering than fostering early growth. They may be as serviceably employed in shielding plants from the fierce glare of a stimulating sun as in sheltering them from the extreme cold of the killing frost. An efficient Protector should retard growth as long as possible—*that* is one of its most important functions. The others are, that it must possess substance enough to absorb sufficient heat in the daytime to preserve its temperature above that of the surrounding air during the night, and that it must likewise admit sufficient light to stimulate and nurture into healthy vigour the whole of the new-made growth. This vigour can hardly be secured unless the utmost facilities are provided for the admission of fresh outside air to every portion of the Protectors. The power of admitting little or much must be provided in the simplest and easiest manner. At times an inch may suffice, at others, on genial days, a current must be driven through from end to end, sweeping clean out every atom of used-up air, and charging the whole area with a new atmosphere, heavily laden with all the needful elements of plant-life and vigorous growth. Another great feature of these Protectors is that in genial weather, one, and that the most important, portion of them may be wholly withdrawn. In our changeable climate this is a matter of the utmost importance. Some days in spring we have all the harshness and bitterness of winter, and anon we have all the warmth and geniality of summer. It is these sudden alternations that ruin our fruit-crops and destroy our tender plants. Now, with these Protectors, the fruit and plants will be alike safe from either kind of weather. When the frost

assails the plants, shut them up closely. When summer comes with her balmy zephyrs in early spring, let us open or remove the glass-doors of our Protectors and let her in. Entering or abiding with an open door all the while, her visit will do no harm; our Protectors will be nicely warmed without their inmates, the plants, being unduly stimulated. When summer retires, all we have to do is to shut the doors after her. It is important to do this immediately, lest the heat she left behind, which is often the case, should be needed on the very evening of her visit.

Several advantages arise from the power of removing and applying part of the Protectors at pleasure. Extremes of temperature are prevented; the plants have all the benefit of the free outside air for a time, and on showery days they may be refreshed and invigorated by the soft falling rain, or on mild nights with the pearly dew. The latter, however, needs caution, as spring nights are proverbially fickle, and the dew may be converted into frost while we sleep. It may also be observed that these Protectors are as efficient against heavy rains, snow, and hailstorms and high winds, as against frosts. These often do as much injury to tender flowers or delicate foliage as frost itself, and it is of the utmost importance that a Protector should protect us against these. From the nature of their substance, should these Protectors ever be overcome by the extreme severity of the weather, they are admirably adapted for receiving the assistance of extraneous protection. They are strong and not readily broken; so that when using them during winter they can easily and expeditiously be wound round or covered over with mats, and kept warm with a layer of long strawy litter or fern. With such additional coverings they become invulnerable against all weathers, and even tender plants will pass safely through our severest winters, inasmuch as they are not only kept from the frost, but kept dry.

A word or two may fitly be advanced here in justification of the name of these Protectors, before proceeding to describe their characters or explain their exact uses. The summary of their merits just given

vindicates their claim to the title of Universal. They are suited for all, can be understood by all, are brought within reach of all, and are likely to be used by all. When once fairly known, they will become a necessity in the garden of the prince as well as in that of the humblest peasant. They are designed for universal usefulness. There is no plant that needs protection that may not receive it by means of the endless modifications of which these Protectors are susceptible.

In future sections, the modes of forming and using them for special purposes will be explained and illustrated. Suffice it here to state that they are adapted for grape-growing on the largest and smallest scale; that with their assistance the cottager may grow with certainty luxuriant bunches for the family dessert; and the commercial company, wine enough to enable them to compete with Continental growers. Peaches, and all other stone-fruits, may be safely carried through our dangerous springs, and nurtured to the highest perfection, by means of these climatic ameliorators. They will solve the difficult problem of how to have good pears every day in the year, and all the year round, by refining the texture, softening the hardness, and sweetening the flesh of many excellent pears that the harshness of our climate renders coarse, corey, and worthless. In these Protectors the *Blanche Colville*, and other of the best French and American apples, may be perfectly ripened in England; while all small fruits, such as strawberries, gooseberries, &c., and early vegetables, such as lettuces, peas, cauliflowers, &c., may be forwarded a month or six weeks in the spring or early summer, and be enjoyed crisp and sweet throughout the greater part of the winter. Tender shrubs, early herbaceous plants, and bulbs of all kinds, winter or spring flowers, may all be safely preserved, enjoyed earlier, and be made to bloom with greater regularity, purity, and beauty, with the aid of these Protectors.

One general principle runs through the whole of them, and yet the principle is so flexible that it can be bent into harmony with the particular wants of each plant as they arise. They can be

extended to any size, bent into any form, applied in every imaginable way. As already stated, they consist of two parts—a solid, durable, strong, opaque base, and a transparent top or side. It is proposed to form the bottom of common earthenware, such as drain-tiles are made of; and the simplest form of these Protectors is a huge drain-tile, say two or three feet long, and a foot deep, without a top, as if it were about to be inverted on a *sole* at the bottom of the drain. On examining it, however, it will be observed that on either side of the top a groove is carried along of greater or less depth on each side. One of these grooves is also as deep again, or more, than the other. The use of these grooves is to receive a sliding lid, or sheet of glass; and the reason why one of them is deeper than the other is that it may carry the rain off the glass roof and convey it to one end. This opaque tile, with its glass roof, is the essence of the Patent Plant Protector. Its simplicity is its chief merit, and there is nothing either paltry or perishable about it. A glass top may occasionally be broken, but neither glass nor good earthenware can ever wear out. Contrasted with the durability of a single human life, such materials may be called indestructible. And then what inexhaustible potentialities are hidden in that simple tile and glass Protector! It possesses in itself the capacity of indefinite expansion, boundless extension. Place them end to end, and miles may be covered with them as readily as feet. They may be carried forward in single file, or squared into dense masses like soldiers. They may line our walks, or scale the fronts of our houses; creep across a steep sloping bank, or fall gently down into a deep valley; become an ornamental coping, or impart massiveness or solidity of base to our walls. They may be used to hide an ugly modern fence, or adorn an ornamental one; by hanging tier above tier, to grow luscious peaches for the table, or superb *Maréchal Niel* roses for my lady's vase. And their shape may be as diverse as their uses.

Can anything be more pliable than clay in the hands of the potter? Every line, every angle, every curve, all shapes come forth and abide

at his will. And these Protectors range through the whole field of useful forms. The one I have described is the simplest of them all. Many of them would have one side much higher than the other, more might require one or both sides curved; some would be egg-shaped, others round; some made to stand on the ground, others to hang on walls, fences, or houses. Again, straight sides would be needed to stand up, as much as long lengths to lie down. Then, for very tender plants, the base and sides of the Protectors could be made hollow, the space between being filled up with dry long fibre, moss, or chaff, and the glass extending over to the outer edge. Such a Protector, with its glass face double glazed and covered over with mats or strawy litter, would prove invulnerable to the inroads of any cold incident to our climate. Of course, the end of the Protectors furthest from the root of the plant would either be made whole or be carefully plugged up; and the end next the root would also need stopping, else the wind would sweep right through from end to end. Modifications of the mode of fixing in the glass are likewise needed for long lengths. The tiles are necessarily lapped or tongued into each other, and the grooves have to be made either deep enough to allow of the glass to overlap, or each tile is so formed as to throw the drip off its glass on to the next.

But such details will be better understood by the illustrations and descriptions of the actual application of these Protectors to particular cases.

PATENT VINERIES AND VINEYARDS.

It will be best to begin with the king of fruits, the grape-vine. It is proposed to grow this both without and with fire-heat by the help of these Protectors.

The plan of the new Grapery appears on the title-page. The Protectors are ranged on each side of a central avenue or promenade over the desired area. The vines are introduced at one end of the tube, and carried through to the other, as shown in fig. 2. There is no limit to

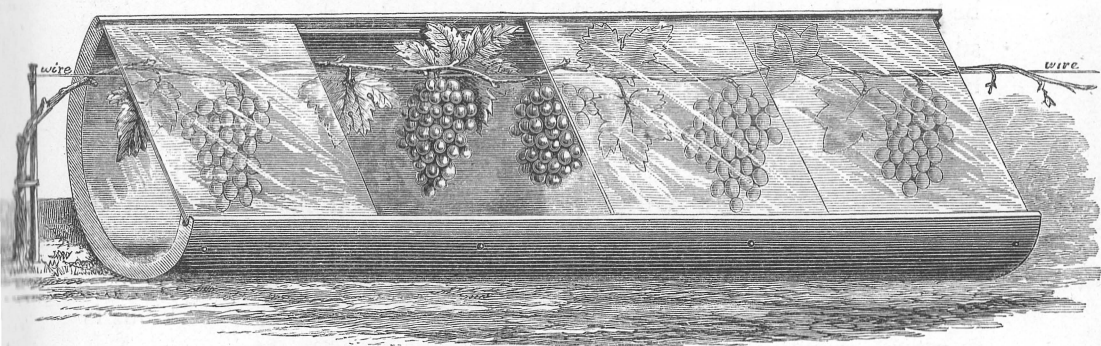


FIG. 2.

the extent to which this may be carried, only those imposed by expense, labour, and space. One or two Protectors may suffice for a mechanic or cottager; from half a dozen to a score for the amateur; while the millionaire or the wine association may provide them by the acre.

One chief object of the Patentee is to bring cheap and good grapes within the reach of all. Our climate as it is can produce sugar from beet equal in quality and price to that which is imported. These

Protectors will enable the home vintages to compete with those on the Continent. In some of the southern and western counties good wines are already produced in very hot situations or against warm walls. The design of the Protectors is to render a crop that is now uncommon, fitful, and accidental, owing to the fickleness of our climate, constant, certain, and general. Common glass and orchard houses could command regular crops of grapes; but they are too costly to cover extensive areas. This new invention affords sufficient protection to ensure a crop at the cheapest rate. By keeping the vines as long as possible in a dormant condition, *they* will afford sufficient shelter to carry the crop safely through the period of spring frosts. Nothing must, however, be done to foster an early growth; on the contrary, throughout the early spring the position of the Protector should be reversed. The vine should be shaded by the tile rather than stimulated with the glass. Up to the end of March the glass might be entirely dispensed with; provided the tiles are placed on the ground, there could be no difficulty in so placing them that they would overhang the vines sufficiently far from the southern side as to keep them dry. Under this cold, dry, sunless regimen, they would hardly attempt to grow. The moment, however, that the vines fairly started, the Protectors would be faced round to the front, and the glass applied. The reason for this change of tactics is twofold. The most obvious is to retard growth until assured that we have power to protect it when made. The grapes are safe while they remain within the shoot of the vines.

But the practice of retarding to the utmost extent during winter and spring is justified by another reason. Growth, to be healthy and strong, must be continuous. When once fairly started, it must not halt or falter on the journey. This is true of all vegetable life, but especially so of tropical or semi-tropical plants, such as grape-vines. In warm climates the transition from winter to summer, from bare stems to full leafage, or perfect inflorescence, is almost instantaneous.

We observe the same phenomenon in our tropical plant houses and our heated vineries. These examples suggest important lessons for the successful culture of the grape-vine under the cool system. No more must be attempted than can be carried through. And as every stage in the progress of the vine up to the flowering state demands a higher temperature than the preceding, it is one of the most vital elements of success in the cool mode of culture not to stimulate growth until the power of our Protectors is strong enough to master the general or accidental coldness of the season. But if from any cause growth has commenced, it must be protected and nurtured by extra covering over the Protectors, so as to keep it warm, for nothing is so fatal to success in vine-growing as sudden and severe checks. And such checks during the season would certainly occur if the Protectors were left on with their glass fronts towards the south throughout the

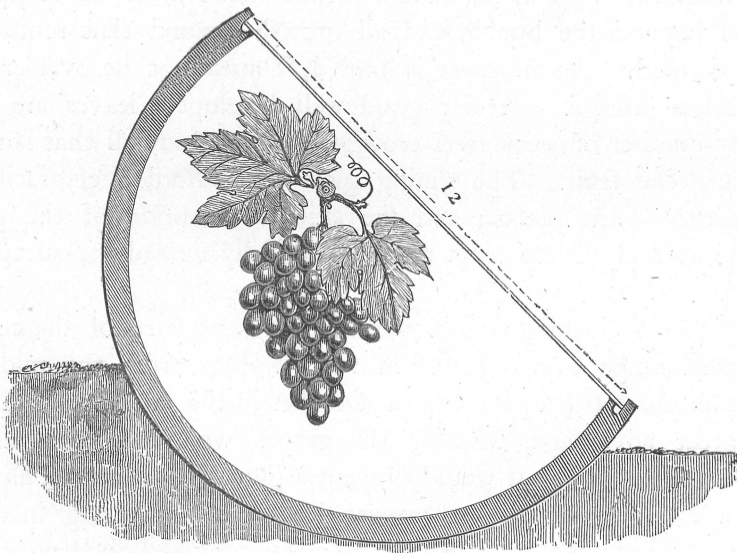


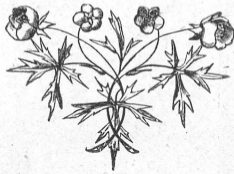
FIG. 4.

winter. But reversed, as before recommended, a crop would be ensured with ordinary skill and common care. At frequent intervals, on each side of the Protectors, small depressions should be made below the level of the grooves, for an earthenware or metallic pin to be laid across. These pins should have two or three holes pierced through them, to enable the vine to be firmly tied in any desired position, and the bunches to be regularly displayed, as shown in the dotted line beneath the glass in Fig. 4. Fig. 8 (see page 16), is a different shaped Protector for the same purpose.

The vines grown in these Protectors must either be kept closely spurred, or treated on the annual system, only allowing the same rod to fruit once. In that case, two rods, a bearing one and a growing one, must either occupy the space together, or in favourable localities the succession rod might be carried along outside, near the ground, in front of the Protector. Either way, the summer treatment would require to be *close*, that is, each shoot must be stopped at one leaf beyond the bunch, and all growth beyond that removed as soon as formed. As the space is limited, it must not be over-crowded with useless foliage. A few good well-developed leaves are better than any number of weak over-crowded ones, and are all that is needed to mature the fruit. The sliding glass tops afford every facility for ready access to the plants; and the skill or attention of the grower must be at fault if the crops are not carefully tended and successfully finished.

The time of ripening would vary in different parts of the country, and would range over a period of four months, from the middle of August in the south to the end of October in the north. This would be a great advantage, whether the grapes were sent to market or converted into wine, as it would prevent a glut of fruit at one time, and afford a company or private grower leisure for gathering in a large vintage. That such a vintage could be gathered in England the Patentee has no doubt. He believes that the whole expense of the

Protectors might be defrayed in two years, and that a handsome profit would be realized by covering acres of ground with the Patent Grape-Growers; and as he intends to form an Association for the growth of British Wines, he will be glad to communicate with gentlemen interested in the subject.



THE PROTECTORS WITH FIRE-HEAT.

With fire-heat this invention becomes as safe while it is so much cheaper than any other vinery. Figs. 5 and 6 show a good arrangement of ground-plans and sections for heating. The vines are planted on each side of a carefully-prepared narrow border running due north and south, and trained east and west on the French horizontal cordon method. The Protectors are arranged to receive the vines as shown in fig. 5. They may be of any shape, and can be extended to any length by simply placing them end to end. So far the heated and unheated Protectors

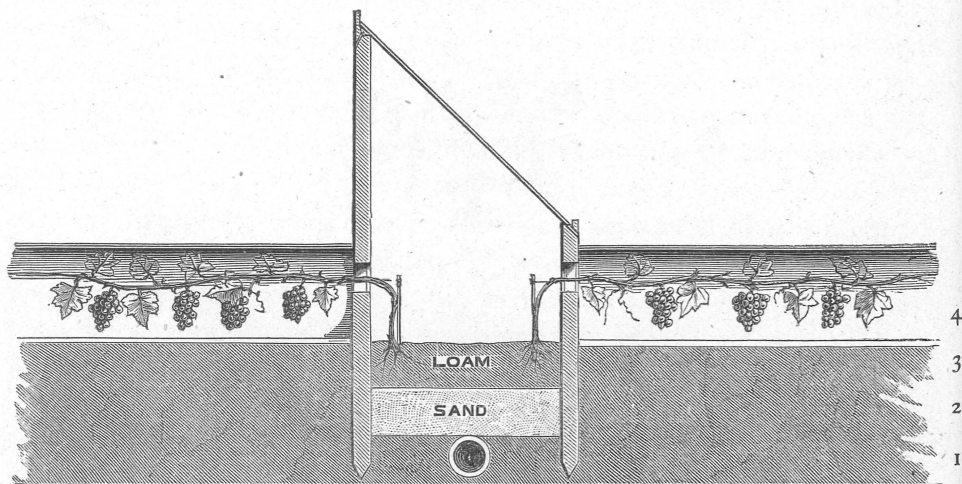


FIG. 5.

are arranged alike. But the inventor has determined, if heat must be used, to utilize it to the utmost. Hence the roots are to be warmed as well as the tops; this is a most important principle, too much lost sight of in relation to our best vineries. By planting all the vines on

each side of a centre avenue, covering the centre over with a large Protector, and causing the other Protectors containing the tops of the vines to diverge from the centre at, or nearly at, right angles, both root and top of the vine will be heated at once. The centre Protector forms the main trunk for the diffusion of warmth from the boiler, stove, or furnace, at one end, to the further extremity at the other. This arrangement would likewise secure a considerable diversity of temperature. The Protectors nearest to the source of heat would be the hottest, and so on in succession to the furthest; and thus a succession of crops might be gathered from one source of heat. At the hottest end could be grown Muscats; Hamburgs in the middle, and Muscadines or others at the coldest end. See fig. 6, in which from 1 to

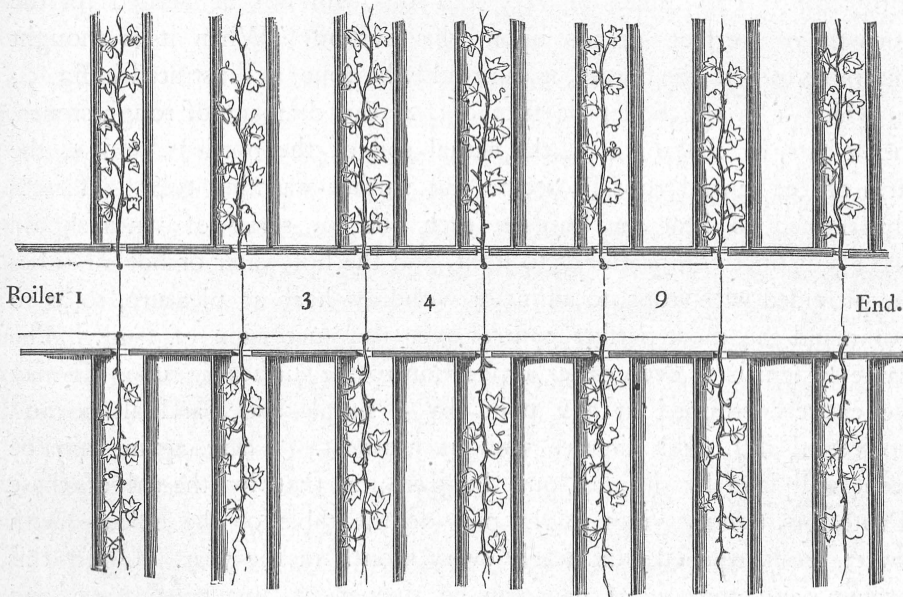


FIG. 6.

3 might be devoted to Muscats, from 4 to 9 to Hamburgs, and from 9 to the end to Muscadines, Esperiones, &c.

However, as it is proposed in this arrangement to dispense with hot-water pipes, and make the air itself the carrier of its own heat, it may be necessary to introduce some checks in the centre tube, or the air may rush too much forward in a straight current, instead of circulating vigorously into the Protectors on the right and left, as desired. To ensure a free entrance of air into the sides, it may also be desirable that they should diverge from the centre trunk in a slight curve, rather than at right angles, as shown in fig. 6. It may also be necessary to introduce some blocks into the centre or heating tube near the source of heat, to force the heat more freely into the sides. The centre Protector should likewise be divided into two portions, a top and bottom space, to quicken the movement of the air. In fig. 5 the border is shown to be heated as well as the Protector. This, unless on very cold soils, will not be needed for the growth of perfect grapes upon this system. When it is thought desirable to heat the border, it can readily be done, as illustrated in fig. 5 ; in which 1 is the boiler or furnace ; 2, the drainage of rough stones, brick-bats, or charcoal ; 3, the actual soil of the border ; and 4, the area of the central root Protector and surface-warming tube. If it is determined to heat the borders, each vine or series of vines should have a distinct compartment to itself, and the hot-water or hot-air tubes be provided with stops, to admit or withdraw heat at pleasure, so as to command the most perfect control over the succession of fruit. The same system is of even easier application to the surface air-tube. It may be entirely stopped at any point by a simple slide, and all beyond converted into cold vineries without fire-heat. These, again, may be kept still later by slipping out the glass ; so that by the aid of these Protectors twenty vines might provide the table of the epicure with sweet, fresh, ripened fruit nearly every month in the year. Under this system, any amount of fruit can be ripened at any given time, and every individual vine may be ripened by itself, as each plant has a house to itself. With fifty vines and the requisite skill, fresh grapes could be gathered from the vine every week ; gathering and starting

Miller's Burgundy, St. Augustine, the Parsley-leaved, the Claret, the Black Cluster, and the Rhenish or White Kissling.

For wine-making only, the Esperione, Miller's Burgundy, the Claret, Black Cluster, Rhenish, and Grizzly Frontignan, are the best as general croppers.

It will astonish many to see the Grizzly Frontignan ranked among hardy grapes; but this exquisitely-flavoured variety bears hard treatment well both in plant and fruit, and imparts a piquancy to the vintage that no other grape can give.

Of course, if the grapes are grown for table, the usual thinning of bunch and berry must be given to develop size in both. If for wine only, less attention will be paid to individual excellence, and more to the gross weight and proper ripening of the entire crop. Still, if Muscat, Hamburgh, or other full-sized grapes, are grown for wine, a certain amount of thinning will be needed to enable the grapes to exhibit their true character, and exert their legitimate high-class influence upon the wines. Without this care quality may be sacrificed to mere quantity, and the wines made from Muscats be little or no better than those produced from Sweetwaters or Muscadines. Small grapes like the Claret and Frontignans will not need thinning, and are in all respects among the very best for wine-making. Even with these over-cropping must be guarded against, as an excessive bulk of ill-finished berries will make less wine of a lower quality than a lighter weight of well-finished grapes full to repletion with rich wine in the cluster. It must never be forgotten that, unless the body of a good wine is formed by nature in the grape, it can never be created afterwards by the art of man. There can be no doubt that better wine may be grown in England by the aid of these Protectors than the majority of Continental vintages, and there is no reason, either in the nature of the vine or in the character of our climate, why we should not, with the aid of the Protector, manufacture Port, Sherry, or Champagne in England equal to the best in the world. By reducing the area of each vine to the

narrowest possible limits, and by steering clear of all the usual expenses of construction, the Patentee has reduced the cost of materials and heating to the lowest minimum, and has brought vine and all other fruit growing within reach of all.

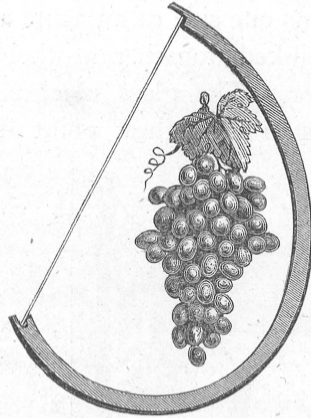


FIG. 8.

PEACH, NECTARINE, AND APRICOT CULTURE IN THE PROTECTORS.

The form best adapted for these purposes is shown in figures 9 and 10. The back forms one side of an acute angle, and the glass the other, while they are linked together at their bases by the curved portion of the Protector. The glass reaches from the top of the straight line at the back to the highest point of the curve in front, as

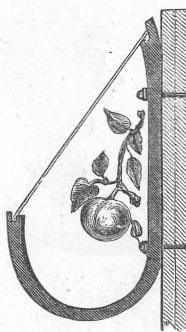


FIG. 9.

shown in figure 9. It thus throws off the rain, hail, or snow, protects from frost, and admits the light and heat of the sun. Figure 10 shows a section of wall with these Protectors ranged one above another, four tiers deep. They may be attached with even more ease to a rough fence of weather or other boarding, or even of dead furze, or on the living surface of a hedge. Brick-walls are by no means needed to grow peaches, &c., to the highest perfection. With the help of this invention the commonest fence may yield as good, or better, fruit as the best wall, at one tithe of the cost and with ten times more certainty. Neither are fences of any kind absolutely necessary. The chief use of walls and fences of every description is the providing of more shelter and better aspects, or sky views, than could be otherwise enjoyed. Now these

patent inventions offer a shelter which can be made perfect or imperfect at pleasure, and have all the aspects in the world at command. Lines of them run along on a south sloping bank would provide an aspect superior to that of any south wall in England; and give the shelter of an Italian valley to a plant in the open air in this harsh northern clime. Reverse the conditions, and choose a bank sloping to the north, and fruit might be retarded for almost any length of time. Now these two objects, the forwarding and retardation of fruits, may be held to be the chief purposes for which walls are built in England. Of course

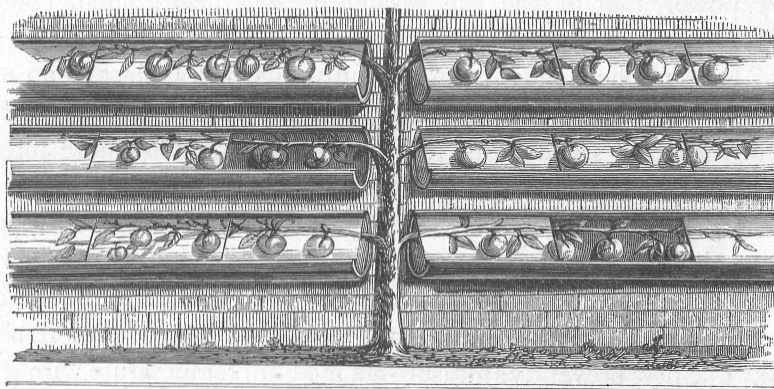


FIG 10.

the increased warmth that their sheltering, interceptive, absorptive, and radiating powers place at our disposal, likewise enable us to grow fruit that we could not bring to perfection without them unless with the aid of glass. Now these Protectors come in as it were between walls and glass. They give us the advantages of each, and save us from the heavy expense of both. We may now enjoy a plentiful supply of wall-fruit without either building brick-walls or glass hothouses. All that is needed for the purpose is "*a trap to catch sunbeams,*" and the wisdom and skill to shut up in the trap, along with the sunbeams, a living shoot pregnant with the germs of beauty and fruitfulness. By a wise adjustment of the one to the needs of the other, luscious fruit will not fail to

come forth at our bidding at the time it is wanted. In fact, the science of fruit-growing may be reduced to a simple sum of the rule-of-three, thus: As the sun-light is to our skill, so is the Protector to the products of both. The sun is our first factor, skill the third, and the Protector the second, by which we utilize or assess the worth of the other two. The power of the Protector multiplied by the force of our skill, and those again measured by the energy of the sun, cannot fail to yield a good return. Much care will, however, be needed to ensure uniform success. We are working with powerful forces in limited areas. Our motive power, that of the sun, is concentrated into a small compass. It will therefore need the more attention to watch and control its operations. Extreme heat must be as carefully guarded against as an excess of cold. Just before, all through, and for some time beyond, the flowering stage of stone-fruits, too much heat would be more likely to destroy the crop than the opposite extreme. It by some mysterious influence throws the blossoms or young fruit off. How this happens is not very obvious. The worst of it is, there is no doubt whatever that it does happen. The blossoms fall, and they cannot be replaced till another year. This loss of bloom or young fruit must therefore be prevented. The best preventive measure is a medium temperature with plenty of air. Peaches, nectarines, &c., in flower should not exceed 60° Fahr. As soon as the Protectors reach a temperature of 50°, air must be admitted freely, and on mild sunny days the glasses ought to be drawn right off. With the glass on, the blossom can hardly be injured by cold; they will bear a freezing temperature, 32° Fahr., with perfect impunity. Peaches and nectarines may be subjected to the same treatment; apricots must have a lower temperature and a more *airy* regimen. There is no stone-fruit so impatient of confinement as apricots. The blossoms seem to fall at the first approach of a close atmosphere. Therefore in mild weather leave the glasses off the Protectors, when there is no danger of frost, night and day. For apricots, the glass must be used with the utmost caution until the fruit is fairly set.

The Protectors may, of course, be used to hasten maturity as well as to set a crop. In that case the temperature may range from 55° to 65° until the fruit is stoned. After it passes this critical period, all danger of losing it may be said to be over. It will bear a temperature of from 60° to 80° with impunity. Being, however, so near to the glass in these Protectors, care must be taken not to burn it with the fierce glare of the sun. Neither should the temperature ever rise above 60° without air being admitted. Only by the free ventilation of the fruit can the highest flavour be reached. Light in abundance, it may be in excess, must be enjoyed in these Protectors. This is highly favourable to the development of quality; but it seems as if a free circulation of pure fresh air were equally needed; and the two combined cannot fail to impart the richest aromatic perfume, so much desiderated by epicures.

As soon as the fruit is gathered the glass should be removed. Exposure to the weather will prove the best completion of the ripening process, and help to cleanse the trees as well. Unless the winter should prove severe, the trees had better remain quite exposed until the beginning, middle, or end of February, according to the locality and the season. If they are put into the Protectors a fortnight, three weeks, or a month before the flowers expand, it will be time enough; and the transition from the outside to the inside must be gradual and easy. First fix the trees in the Protector and leave them for a few days without glass; then slip the glass over a few inches for a few hours or days at a time. Let the trees glide imperceptibly into their new quarters. It is of the first moment in the culture of stone-fruits to avoid all sudden checks. This gradual enclosure in the Protectors must therefore be practised.

Some seasons the changes of the weather are so sudden and severe that we are saved all this trouble. The temperature runs down perhaps from 55° to 25° in the beginning of February. Seize the moment of violent change for placing your trees safely in the Protectors. By

thus taking opportunity at the flood you will not only save your crop, but get over all the anxiety incident to a period of gradual transition. But it is time to explain the actual mode of placing the trees within the Protectors. It is obvious that ordinary trees could not be got in. In this, as in all other cases, we must adapt the form and size of our trees to the size and form of our house. These houses are small; it follows that the trees must be small likewise. But we wish to gather a maximum weight of fruit from a minimum of space; therefore fruit must bear a greater proportion to mere size of tree and area of leaf than usual. The form must also be moulded into harmony with that of the house. From all which it follows that our tree must be something like the back of a herring— one large bone running along the centre, supported on each side with small bones diverging at regular intervals all the way along; in other words, it must be a cordon bristling with tiny branchlets and sturdy fruit-buds. It is of less consequence whether each such cordon or branch should have a root all to itself, or whether one root should support four, eight, or ten such cords. The point here is, that such a cord must be provided for each Protector, as no other branch could be got comfortably in, or produce one-fourth of the produce if it could. A tree or branch like this will bear fruit regularly and plentifully from base to summit, completely filling the Protector with fruit. It will require some skill to grow perfect cordon peach, nectarine, and apricot trees for these Protectors; but they will prove highly remunerative, and this form has been strongly recommended by Mr. D. T. Fish, Mr. W. Robinson, and others as the best mode of covering walls, for profit, altogether apart from this mode of culture. As soon as the fruit is set the wood must be carefully disbudded, and only shoots left in the best positions. Each young growth should be stopped at the second leaf, and be pinched back to that, or at the most one beyond it, throughout the summer. When the first green-fly appears, the Protector must either be filled with tobacco-smoke or the plant drenched with tobacco-water, as this pest must not get foot-hold, or the trees will

be weakened or ruined. On the evenings of bright days the glasses should be withdrawn, and the plants heavily syringed, as a means of imparting new vigour and of preventing the ravages of red-spider. Another danger to be carefully avoided is that of over-cropping. Trees trained on this close system generally assume a fruitful habit. They will show ten times the quantity of fruit that they should be permitted to bring to maturity. The number of fruit must be fearlessly reduced by judicious thinning, if the highest quality is to be realized. With attention to these simple points, any quantity of these high-class fruits may be gathered from these humble, cheap, and efficient Protectors.

Any of the usual varieties may be grown. Perhaps the following will prove as useful and good as any others:—

PEACHES.—Noblesse, Royal George, Rivers's Early York, Galande, Barrington, George the Fourth, Stirling Castle, Red Magdalen, Grosse Mignonne, Bellegarde, and Chancellor, for main crops. For later varieties the following may safely be selected: Lord and Lady Palmerston, Princess of Wales, Salway, Walburton Admirable, and Yellow Admirable.

NECTARINES.—Downton, Early Newington, Elruge, Hardwicke Seedling, Hunt's Tawny, Pine-apple, Pitmaston Orange, Rivers's White, Roman, and Violette Hative.

APRICOTS.—Moor Park and Early Moor Park, for the main crop, Hemskirk, Kaisha, Orange, Roman, and Royal.

PLUMS.

These may be grown in the Protectors as readily, and with even a greater chance of constant success, than apricots, as they are not quite so impatient of heat. They will do well under the same treatment as peaches and nectarines, and will endure with safety as much heat. Still, sudden change and excess must be carefully guarded against during the process of setting, which is a critical stage in plum-culture; it is like-

wise a most deceptive stage. The embryo fruit often seems all safe for nearly a week after the bloom is shed, and just as one begins to exult over a full crop, presto! they all change colour and are gone—all, at least, except one here and there. The chief cause of this loss of young fruit is imperfect setting. The blossoms may have got a chill, dull cold weather has prevented the maturation, or hindered the distribution of the fertilizing pollen, and barrenness is the necessary consequence; or an excess of heat has pushed the blossoms too quickly, through the setting period, and the one opportunity has been missed. Time was not given for the completion of the processes that are essential to the production of fruit. The Protectors properly used will enable us to steer a medium safe course, removed alike from the extremes of both heat and cold, and to obtain a regular crop; they will keep out the cold and equalize and moderate the heat, providing the exact conditions essential to fructification. The general treatment of plums will not greatly differ from that of peaches, nectarines, or apricots. Even greater care must be exercised against the attacks of insects, and their first beginnings be checked by similar appliances. Green and black fly are ravenously fond of soft green plum-shoots, and they must be kept off them accordingly. Stopping, thinning, ripening, and exposure of the wood may follow the same course as that recommended for the other stone-fruits. The Protectors may be removed as soon as the crop is safely set, or kept on to foster an earlier maturity, just as circumstances may require. In any case, they should be wholly removed as early in the autumn as possible, to expose the plants thoroughly to the autumnal sun. Wasps and flies are often terribly destructive to luscious plums; and as these Protectors will develop quality to the very utmost, the fruits grown in them are likely to be violently assaulted. When the glasses are slid out for ventilation, these ravenous marauders will rush in. To prevent this, it will be necessary to remove several squares of glass, and fit in, in their stead, pieces of the same size of finely-meshed wire-netting, muslin, or canvas. This will admit the air

and keep out the flies and wasps, so that the fruit may be thoroughly ripened and enjoyed in a perfect state, as it is wanted.

The following are among the best varieties of plums:—

All the Gages, Coe's Golden Drop, the Jefferson, Magnum Bonum, Early Prolific, Kirk's Peach, Reine Claude de Beval, Reine Claude Rouge, and Blue Impératrice for very late crops.

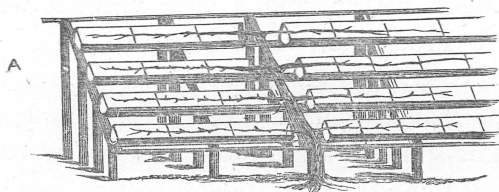
For kitchen use the following are among the most useful: Goliath, Orleans, Diamond, Coe's Late Red, Cox's Emperor, and Belle de Septembre, and Dennis's Victoria.

CHERRIES

May be had much earlier, and a crop ensured with certainty, by the help of these Protectors. The trees may be confined to a single branch, or the Protectors may be arranged to receive the branches of a common horizontal-trained cherry-tree. As most cherries bear best on the close-spurred system of training, scarcely any modification of the usual mode of treatment will be needful for growing the fruit in this manner. Most of the best and highest-flavoured cherries will become better still in the warmer climate thus provided for them. The chief things to guard against are sudden excesses of heat and the attacks of insects. Cherries are apt to fall off prematurely in the same manner and from similar causes to those affecting plums. Occasionally they set too thickly, and will need judicious thinning, if fruit of the heaviest weight is desired. The young shoots will need shortening and close pinching, to prevent overcrowding, and admit the direct light of the sun to the fruit. Only the best varieties, such as Belle de Choisy, Belle Magnifique, Bigarreau, Black Heart, Black Eagle, Cleveland Bigarreau, Downton, Elton, Frogmore Early Bigarreau, Knight's Early Black, and White Heart, should be grown in these sunbeam traps, and producing the richest and largest cherries.

PEARS.

Notwithstanding all that has been written on French and English fruit-growing, and the various views that have been expressed on their relative merits, one fact seems clearly established, and that is, that the pears of both countries might be better grown than they generally are. If the French pears have too much, ours have mostly too little heat, while the sudden alternations of heat and cold in rapid succession, to which the young fruit in its most tender condition is exposed, lay the foundation of that hard granulated flesh which is the greatest drawback to the quality of English pears. Now these Protectors provide

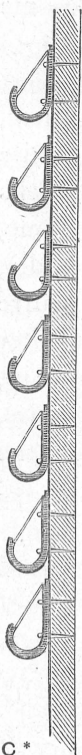


A.—FRONT VIEW OF A TRELLIS FOR PEARS.

a warmer climate, and guard against sudden and severe changes of temperature. They may therefore be used with the utmost confidence and certainty of success for the growth of pears; and no fruit is more worthy of all the care we can bestow upon it. The flavour, the beauty, the durability of good pears raise them to the first rank of dessert fruits. By the aid of these Protectors, there seems no reason why such splendid varieties as the Chaumontel should not be as well grown in England as they are in Guernsey or France; for this invention will not only improve quality, but develop size and weight to the utmost. No kind of fruit-tree can be so easily moulded into a suitable form, or preserved in a full bearing state, adapted for this mode of culture, as the pear. With ordinary care in the stopping and pruning, each branch becomes naturally a cordon, which increases

in fruitfulness year by year. Neither is the pear at all subject to disease or the attacks of insects. The rusting and blistering of the leaves that often weaken and disfigure pears would be prevented by the genializing influence of these Protectors; and, unless too much dry heat was given, there would be no danger of red-spider or thrip attacking either leaves or fruit. The best antidote against either pest is a cool moist regimen, with plenty of air during the day. The proper period for applying the maximum degree of heat to fruits in them is from four to eight o'clock in the afternoon. Moistened overhead from about four to six with a fine syringe, the glasses may be shut down, and a high moist temperature be allowed to exert its full sway with the greatest advantage to the fruit.

The young shoots should be pinched back as every succeeding leaf is formed, so as to keep the fruit-spurs close at home, and permit the light to have free access to the fruit. At the winter-pruning, most of these spurs must be cut in to a single fruit-bud, which will be seen fully rounded off and ripened at its base. By this close treatment, the trees or branches will continue in a bearing state for many years without becoming too large for the Protectors. Great wisdom and firmness will be needed to reduce the number of fruit sufficiently. Thinning tells more favourably upon the culture of pears than on almost any other fruit; it not only concentrates the weight of a dozen fruit into one or two, but it changes the entire appearance, and gives a higher quality to those that are left. One great reason why the French fruits look so much handsomer than our own is that they thin more freely than we do. By following their example in thinning, and providing as good, or a better, climate

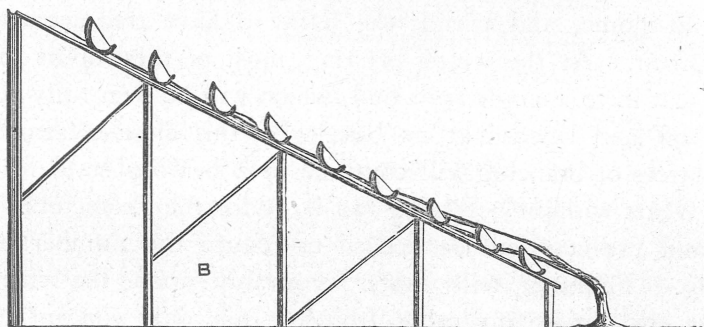


* C.—Section of Wall, exhibiting the Protectors, seven in depth, as used either for Vines or choice Apples; or, in lieu of the trellises, earthen banks may be thrown up, or the slopes of railway embankments used as a base for the Protectors.

by the aid of these sunbeam traps, there seems no reason why our pears should not prove not only as good, but better, and as handsome as theirs.

The following varieties would prove a good selection :—

Williams's Bon Chrétien, Thompson's Van Mons' Léon Leclerc, Suffolk Thorn, Passe Colmar, Knight's Monarch, Marie Louise, Louise Bonne of Jersey, Jersey Gratioli, Jargonelle, Glou Morceau, Gansel's Bergamot, Fondante d'Automne, Easter Beurré, Duchesse d'Angoulême, Délices d'Hardenpont, Crasanne, Citron de Carmes (the earliest of all), Brown Beurré, Broom Park, Beurré de Rance, Beurré Superfin, Beurré Clairgeau, Beurré d'Amanlis, Urbaniste, Beurré Hardy, Winter Nelis, and Chaumontel. Vicar of Winkfield, Uvedale's St. Germain, and Bellissime d'Hiver, are very large and handsome stewing pears, which might be grown to enormous weight with the aid of the Protectors,



B.—SECTION OF TRELLIS FOR PEARS.

APPLES.

They will likewise bring the choicest varieties of apples to the highest perfection, and open up a new era of excellence for such old-established sorts as the Golden and Ribston Pippins, as well as enable us to grow the famous American and French varieties of the finest quality.

With their help there is no reason why the Newtown Pippin and Calville Blanche should not be grown here as well as in America or France. Handsome fruit of the latter variety command a shilling apiece in Covent Garden Market, and would look glorious nestling in these sunbeam-traps. Many of the Pearmain, Nonpareils, Russets, Pippins, and even that handsome variety, the Nonesuch, would assume new beauty and higher quality within these Protectors.

Apples require the same culture as pears. They are, however, rather more liable to the attacks of insects. Aphides and American blight are their greatest enemies. The former is easily destroyed with tobacco dust or water; the latter may be got rid of by the persistent use of methylated spirits of wine or turpentine. The turpentine, however, must not be applied to the leaves, as it would burn them; but this pest accumulates upon the wood, and a brush dipped in turpentine can be applied to it there with fatal precision and deadly effect. By thinning the fruit freely, and adopting a stimulating regimen for top and bottom, most of our best apples may be grown almost beyond our knowledge in these Protectors. The following will answer well; but almost any famous American or Continental variety may be grown as well as the Calville Blanche or Newtown Pippin.

The following are good useful dessert apples:—

Dutch Mignonne, Devonshire Quarrenden, Cox's Orange Pippin, Court Pendu Plat, Adams's Pearmain, Claygate Pearmain, Blenheim Pippin, Braddick's Nonpareil, Scarlet ditto, Gravenstein, Irish Peach, Melon Apple, Kerry Pippin, King of Pippins, Margil, Lord Nelson, Lord Burghley, Reinette Blanche d'Espagne, Reinette du Canada, Royal Pearmain, Scarlet Crofton, Wormsley Pippin, and the sorts already named.

GOOSEBERRIES, RASPBERRIES, AND CURRANTS.

These Protectors will also prove most useful in forwarding by a month or six weeks the ripening of these fruits. Single rods of rasp-

berry canes can be laid into them during March or April, and the crops brought on in them as rapidly as possible. By forwarding some in this manner, planting on different aspects, and using the double-bearing sorts, this delicious fruit may be enjoyed throughout the greater part of the summer. The yellow varieties are especially adapted for this mode of culture. Gooseberries and currants would have to be trained on the cordon or single-stem plan for this purpose. They could be taken into the Protectors in succession, and thus a month or two added to the season of these refreshing fruits.

STRAWBERRIES.

These Protectors will bridge over an awkward gulf in the continuous supply of this most luscious of all our English fruits. It is comparatively easy, with the requisite means, to command a constant supply of forced strawberries from February to the end of May; but throughout May it is a common occurrence for the supply to fail. This invention fills up the gap by bringing the strawberries out of doors in the open ground on to succeed the receding crops that have been fruited in glass-houses. It thus provides the means of continuing the supply to those who have been enjoying strawberries for months, and at the same time enables those who have had none to have them a month or six weeks sooner than they could have done without them. In the one case it links together the forced and the natural crops in unbroken continuity, in the other it brings the luxury of semi-forced strawberries within reach of all who can afford a few shillings for a single Protector. It is impossible to overrate the usefulness of this invention in its adaptability to strawberry-growing; it will not only forward the crops by husbanding warmth, but it will likewise improve their quality by exposing the fruit to the full influence of a warmer climate and a clearer light. An excess of rain will likewise be excluded by the sheltering glass, while the crops may be readily made perfectly

proof against the inroads of snails from beneath, or the attacks of birds from above. The Protectors will also prove useful auxiliaries to the forcing department; they will provide an early and vigorous crop of runners several weeks in advance of those generally produced. The value of them as a means of furnishing early plants for potting is of greater worth than their entire cost. An early start means, with liberal culture, vigorous growth and early maturity, and these again are the foundations of a rich and heavy return of forced fruit.

Fig. 11 is a representation of the Strawberry Protector. It will be seen

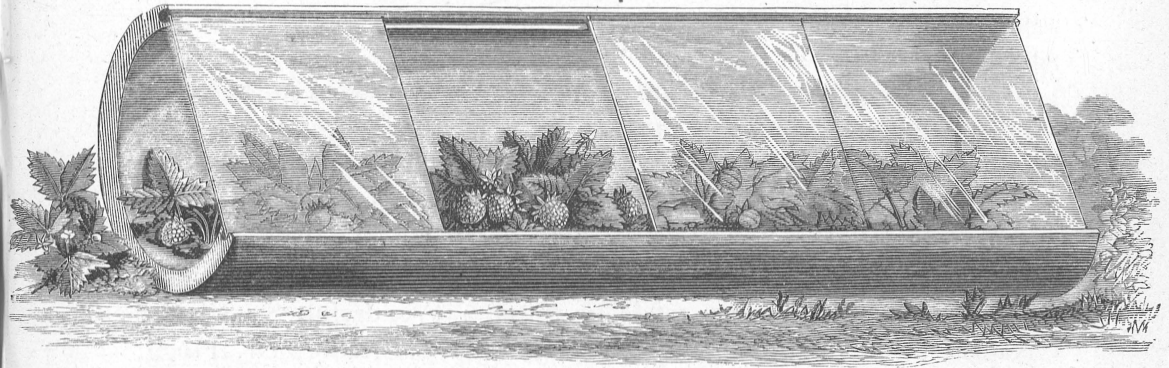


FIG. 11.

that considerable modification has been made to suit the habit of the plants. A hole in the bottom enables the plant to enter in; the Protector is then fixed firmly down into the earth, the glass slid in, the ends blocked up, and the arrangement is complete. Ventilation is given by tilting up the sides of the glass tiles. In fig. 11, of course air is admitted by simply sliding the glass out or in, as in the fruit-tree Protectors. One great element of success in strawberry culture consists in carefully giving air during the flowering period. In no case should the sun be allowed to shine on the flowers in a saturated condition. The heat of the sun will exhale much vapour from the air, and often in the early

morning the leaves and blooms will be dripping with wet, or covered all over with pearly dew-drops. Most of this water must be distributed before the sun shines directly upon the plants; and if this is found to be impossible, then air must be admitted simultaneously, or rather before any considerable rise of temperature. If these precautions are neglected, the hot vapour of water appears to convert the pollen dust into a heavy paste, and no fructifying energy can pass from the pollen to the stigma; and because of this want of buoyancy in the pollen the fruit will refuse to swell, and all our labour be lost. But with early ventilation, efficient care, and liberal culture, in the form of top-dressings of rich dung, and alternate waterings with liquid manure, nothing can be more certain than success. To gain the full amount of benefit from the Protectors, the plants should be watered in the morning and not at night, and with water at a temperature of 80° Fahr. Should any cold nights supervene, nothing can be simpler than the covering of such Protectors with strawy litter or mats. To facilitate such coverings the Protectors might be arranged in square or other blocks, instead of being extended in rows. The following are among the best varieties for this mode of culture: Wonderful, Sir Charles Napier, Princess Royal, Myatt's Eliza, Eclipse, Eleanor, Dr. Hogg, British Queen, Bicton Pine, Admiral Dundas.

It is hoped that this invention may stimulate the culture of fruit as much, or more, than the abolition of the excise duty on glass, and that it may be the means of bringing all our best fruits within the reach of every one, so that instead of grapes, peaches, plums, apricots, nectarines, and the best apples and pears, being looked upon as the luxury of the rich, they may become the comfort and common necessities of the poor, to the end that more of the hungry may be daily fed abundantly with good things, and that the time may be hastened when none shall be sent empty away.

VEGETABLE GROWING IN THE PATENT PROTECTORS.

POTATOES.

In potato, as in strawberry, growing there is often a hiatus between those forced in frames and those that are obtained from warm sheltered places at the bottom of walls, &c. The potatoes grow almost too fast in such positions. The great want hitherto has been some simple means of protecting the tops from sudden frosts. Again and again the latter comes and sweeps off within a few hours all prospect of a good, early, and plentiful crop. It is not only that the frost throws the potatoes back for a month or six weeks, but it often ruins the crop entirely. The destruction of the top checks the growth of one set of tubers, and with a fresh start at top a new set of tubers are started at bottom. Hence, when crops that have been frozen down are lifted, instead of one good crop of uniform-sized and full-grown potatoes, two or more crops of different-sized tubers are formed; and too often it happens that the whole are comparatively worthless in quality; for not only are they imperfectly developed in size, but they are all found in an abnormal condition. The first-formed prematurely-arrested tubers will frequently have started into an extraneous growth, as if they were *sets*; their small eyes have burst forth into a kind of underground stems, showing small potatoes at their extremities. And of course when this happens the first formed tubers are utterly worthless, and the second or third succession are so crude and immature as to be wholly uneatable.

The remedy for all these evils is simple enough. The potato-tops must never be permitted to be frozen through nor down. From the moment they burst through the imprisoning soil into the air, they

should be jealously guarded from severe cold. No frost must be permitted to breathe upon them with its icy breath. The importance of this has been fully recognized by all cultivators. The practical difficulty hitherto has been to find some cheap and simple contrivance effectually to keep out the cold. These protectors meet and master this difficulty. They do more: they assist the grower to avoid it altogether, or convert it into a positive advantage; for they not only enable us to shut out the cold, but to close in the heat. Their influence is not simply or chiefly negative, but positive: they set frost at defiance, and place as much of the heat of the sun at our disposal as the potatoes require.

Run along at the base of south walls, and themselves protected with mats or litter in very severe weather, potatoes may be gathered from them almost as soon as from dung-frames; and then successional crops may be brought in on warm banks sloping to the south, the rows crossing the banks at the best angle to enable the protector to intercept and absorb a maximum amount of heat.

Of course the earliest varieties will be used for these purposes, and as almost every grower has his favourite sort, it would be a waste of space to give a list of varieties. Suffice it to say that those—such as the Moss Kidney and the different varieties of the Ash-leaved Kidney and others—that have the least top are to be chosen for this purpose. Such a course of culture must likewise be adopted as shall be most likely to swell the tubers rather than unduly elongate or *draw* the tops. To this end, as much air as possible should be admitted on genial days, and during the bright sunshine the glass lids may be wholly withdrawn. On no account, however, should the cold rains of spring be permitted to fall upon either leaf or tuber. The crops may probably require from three to six good waterings during their progress. The only important points concerning these are, that the water should be applied before noon on warm days (not, however, if it can be avoided during bright sunshine), that the amount should be liberal enough to pass right through the whole mass of roots, and that it should range in temperature from

65 to 75 degrees Fahr. As to soil, a mixture of two parts sandy loam and one of leaf-mould will answer well; but any good garden mould will grow potatoes. Much of the future success will, however, depend upon the proper preparation of the seed. It should be thoroughly greened by exposure to the light and air, and then stored away in single layers on shelves or on the floor of a dark shed until wanted for setting. Every potato will then be found to have formed a number of strong sturdy shoots, resembling more the young stems of large broad or green Windsor beans than of ordinary potato growths. The number of these should be reduced to two or three, and the potatoes inserted in the ground whole, with the sturdy shoots carefully preserved unbroken. No sooner is this done than roots and tubers begin to be formed at the base of the shoots, and at least a month's time is gained by these preliminary proceedings above ground. Neither does this gain of time, important as it is, exhaust the advantages of the greening process. Additional strength is acquired as well as valuable time saved, and the crop is not only gathered much earlier, but is likewise of heavier weight and finer quality. The universal adoption of the greening process, combined with the use of these Protectors, would bring the choice luxury of new early potatoes within reach of all, and thus not only add to our enjoyments, but increase the supply of one of our most important articles of food.

PEAS.

Next to potatoes, probably peas are our most pleasant, useful, and nutritious vegetable. In fact, in nutrition it far exceeds the potato, weight for weight; but as the potato so far exceeds it in gross yield per acre, perhaps their nutritive values may practically be accepted as about equal. What we lose in bulk or weight in the pea crop, as contrasted with the potato, we gain in feeding capacity and flesh or muscle forming power. These Pea Protectors will enable

us to gather green peas probably two months earlier than at present. And the pea season will be prolonged as well as hastened by their use. By growing late dwarf varieties, such as the Peabody Pea, a good late dwarf sort, green peas may be enjoyed with our Christmas roast beef and plum-pudding. The pea crop will constantly be in

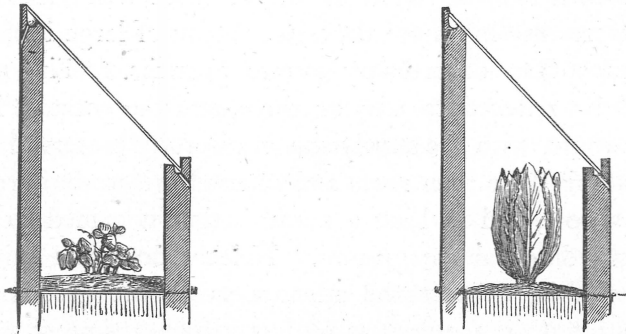


FIG. 12.

hand—either sowing or gathering may be enjoyed every day in the year. It is customary now to sow the first crop in November, to sow again in January, and then twice a month up to the end of June. These sowing times will have to be extended at both ends, and only dwarf varieties be used for latest and earliest purposes. The spring crop will have to be sown in October, and the last winter crop in August or September. Warm sheltered situations must be chosen for both purposes. Such positions as those indicated for potatoes will do equally well for peas. An artificial sloping bank, with an angle of about 30 degrees facing the south, will answer well. The soil should be a thoroughly-drained, moderately-rich, friable loam. Sturdiness of growth should be aimed at in all the preliminary stages. And for the winter crops it will be better not to use the Protectors at all until the danger of frost appears. It is quite possible the dwarf peas, though sown in

September, may come into bloom without any help from the Protectors; and if they can be bloomed and set in the open, so much the better. The Protectors then cannot fail to forward the pods to sufficient maturity; and the slower this work can be proceeded with, the later the season of green peas will be carried into the winter. Should, however, the weather prove too cold to forward the crop up to or beyond the blossoming period, then the Protectors must be slipped over them. Much care will be needed to ensure a free setting of the pods; every ray of sunshine will have to be taken advantage of, and the air admitted freely until this critical stage is passed. After that period more heat may be given and less air admitted. In fact, beyond this stage the crops may be pronounced safe, and can be safely pushed forward or retarded at pleasure, as the desire or wants of the cultivator may determine. If possible, the temperature should not exceed 65° nor fall below 35° ; from 40° to 60° would be a safer latitude to range through. But any degree under 35 would be apt to injure the flavour of the crop, although it might not seriously paralyze the energies of the plants. It is no uncommon thing for our late pea crops to pass through as much as three degrees of frost without being destroyed, but the least touch of the ice-king robs green peas of their delicious aromatic flavour. And with the protecting power that this patent places at the disposal of the grower, it will be safer to maintain the pea plant at least five degrees above the freezing point.

This precaution is not so important for the advancing crops in the spring, from the reason just given, that the plants are less tender and not so easily injured as their produce. Still, having the means of preventing it at hand, it will be better not to allow the spring plants to be actually frozen. Consequently, the earliest crops had better have the Protectors left permanently upon them. During mild weather, the glass could be removed, to be instantly replaced at any time of need. Any actual culture needed beyond the vital point of ventilation would consist in watering about the same number of times, and with water of the same

temperature, as that recommended for the potato. Possessing the means of enclosing terrestrial heat in small areas for almost the first time, it is most important to note the immense power of ameliorating temperature that the judicious use of warm water to the soil out of doors places in our hands. It will prove a most valuable stimulant to the growing crops, and an agent of great force and value in enabling the cultivator to keep out the cold from the interior of these Protectors.

As already remarked, only dwarfs can be grown. Doubtless, as this invention is more widely known and its value appreciated, all our best peas will be well represented by dwarf varieties. At present, the choice is somewhat limited, and perhaps the following will be found as useful as any for this mode of culture; but, of course, any other variety ranging from a foot to a foot and a half in height will answer equally well. For earliest work, to be sown from October to January, Tom Thumb, or Gem, one foot high, is perhaps the best. Sow, to succeed it, and indeed at any time in these Protectors, Bishop's Long-pod, a foot and a half high, a good useful sort; M'Lean's Little Gem is a wrinkled pea of good quality, one foot high; the Dwarf Waterloo, a late branching marrow, fifteen inches high; and the Peabody, an equally good or better variety, of the same height. These dwarf marrows might be sown during August or September for winter supply; and the last sowing of all, in October, with any hope of consumption at or beyond Christmas, should be of the Tom Thumb variety. It is hardier than the marrows, and might come in during the dead of winter, or any time during the spring.

BROCCOLI AND CAULIFLOWER.

Next to peas and potatoes, these are our most important and useful vegetables. The Protectors would assist us in two ways in connexion with these crops. They would preserve the crops already grown, and enable succession crops to move on all through

the winter and spring. By the exercise of these dual functions a continuous supply of broccoli of the best quality would be obtained with certainty. Their quality would not only be improved, but preserved. Nothing destroys the crispness or extracts the sweetness more effectually from either broccoli or cauliflower than alternate freezings and thawings. These processes may leave the colour as good, the form as perfect as ever, but they have insidiously stolen away that unseen essence that constituted their highest quality and imparted the best flavour. To preserve these, all our most delicate broccolis should, if possible, be preserved unfrozen. The varieties of broccoli are legion, and every grower has his favourites, so we will not select varieties, but, merely to give definiteness to these remarks, one will be named which is a universal favourite, and may therefore represent all good qualities. The Walcheren broccoli or cauliflower, as has recently been remarked in the *Florist*, places the luxury of cauliflowers within our reach almost throughout the year. With the help afforded by these Protectors the circle of unbroken supply may be completed.

To begin with the seed, a pinch may be sown every month from January to the end of October. Of course the sowings up to April will need to be sown in a Protector, and the plants sown in October will likewise need protection. As a rule, then, the Protectors will be in request for six months in the year, that is, from November to the end of April. If the weather is mild, probably the glass will not be needed till December, and it may generally be almost wholly dispensed with after the middle of April; therefore, while the Protectors themselves are present for six months, the labour of working them by moving the glass will be confined to about four.

Now as to the mode of using them. The first principle is to get as many broccoli into each as possible. Supposing, then, that during November or December matters have been so managed as that a number of these plants are just showing their embryo flowers, such plants should be carefully taken up, a few of the bottom leaves removed,

and then planted thickly together in a double or treble line, according to the size of the Protectors; the plants should be deeply inserted in the soil, the earth coming right up to their bottom leaves, and their heads packed closely together without being overcrowded. When the process of transplantation is completed, if the weather or soil are at all dry, the plants should be well watered with water at sixty degrees, and the Protectors placed over them. Should the next few days be sunny, the plants should be slightly shaded to prevent their flagging; but as soon as they get over their removal they must be thoroughly exposed to the light and air by the entire removal of the glass, and anything approaching to a coddling regimen avoided. On no account must they be forced into a tender etiolated growth; on the contrary, the utmost strength and hardiness must be developed; under such treatment the flowers will be gradually enlarged and slowly pushed forward. Safe from frost, and enjoying a temperate clime, the plants cannot but succeed, while the number packed in a limited area enables the grower to cut and come again at the smallest possible cost.

A later batch of plants should be treated in the same manner, as to transplantation, &c. These will succeed the others, and, by having a third and fourth batch, a regular supply would be ensured. The moving would tend to throw the latest plants into flower, while the Protectors, by maintaining an equable temperature, would prove the most powerful antidote against the great plague of "buttoning."

The growth of broccoli and cauliflowers in the Patent Protectors might be managed so as either to coalesce with our present mode of securing early cauliflowers in hand-lights, or they would enable us to dispense with these altogether, as they combine all the merits of the best hand-lights, and quadruple their protective power, at a tithe of the cost. By such processes as are here described a plentiful winter and spring supply of delicious broccoli would be obtained. Beyond that period the mode of culture is so simple that it need not be pursued. Neither would it be desirable to dismiss the many excellent varieties of

broccoli that generally pass through our winters unscathed. These Protectors need not supersede any other mode of culture, while they would prove the most useful auxiliaries to all other methods. They would likewise prove invaluable in severe winters. When the outside crops were destroyed, as they often are, the inside ones would be of the highest service. And if a certain quantity were thus secured against all risks every year, no one could be left wholly destitute of this most wholesome and delicious vegetable. Spring cauliflower plants could likewise be safely carried through the winter and forwarded in these Protectors more safely and readily than under ordinary hand-lights. The thick opaque bottoms would afford a stronger protection against frost. The glass top admits sufficient light and air, while their form simplifies the process of covering with litter or straw mats during severe frosts.

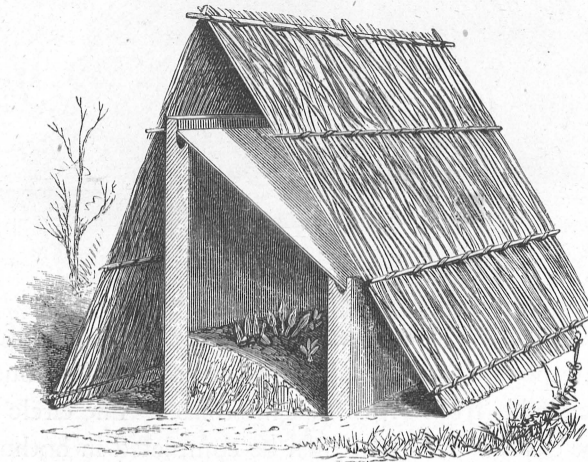


FIG. 13.

KIDNEY, DWARF, OR FRENCH BEANS.

For extending the season of this invaluable vegetable at both ends, these Protectors are specially adapted. This is one of the tenderest vegetables we grow. If the frost only looks at them they either wither

or die, or lose their flavour. This fact contracts the French bean season to the narrowest limits. By forwarding the early crops under these Protectors a month or six weeks will be gained, and an equal extension of time may be secured by covering the latest crops in the autumn. It deserves consideration, indeed, whether it would not be worth while to send a hot blast of air through the Protector in the spring and autumn, for these crops, in the same manner as has been illustrated for grape-growing.

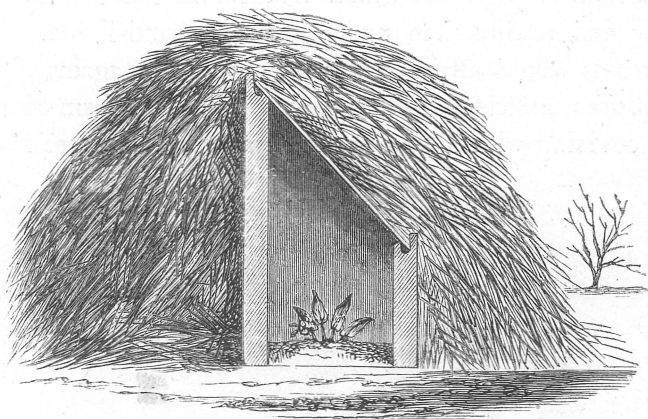


FIG. 14.

With such help, and a wise selection of varieties and skilful culture, it would be quite possible to extend the season of this deliciously sweet and wholesome vegetable from April to Christmas. The circle of unbroken supply for the entire year might then be completed in hothouses. Artificial heat could be applied to peas in a similar manner, not perhaps, however, with the same certainty of success, as peas do not set so readily in artificial warmth as kidney beans. There need be little or nothing special in the culture of these beans in the Protectors; strength and dwarfness of habit, a genial atmosphere to prevent the manifestation of thrip or red-spider, the thinning of any leaves that may unduly shade

the flowers, and the immediate removal of all as soon as they change colour, and thus reveal the fact that they are exhausted and have become useless, with due attention to watering and ventilation, and extra coverings for the earliest and latest crops, will be all that is needed. On no account must any beans be left on to ripen. For every seed so ripened, a dozen of green eatable pods will be sacrificed; and as seed can be so easily grown out of doors, it would be a wanton waste of force to allow it to encumber or lessen the produce of the Protectors. As to varieties, the shorter and earlier they are the better. The following will be found suitable for cultivation in this manner: Early Six Weeks, Royal Dwarf, Dwarf speckled China, and Sion House.

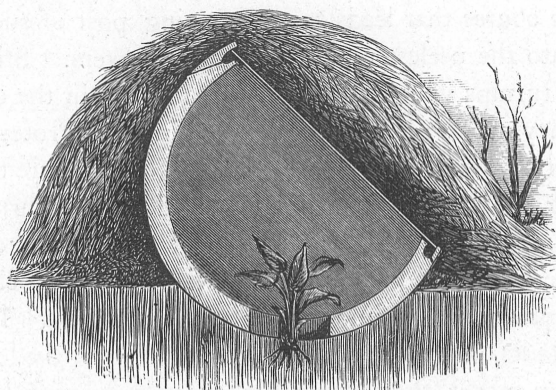


FIG. 15.

CARROTS AND TURNIPS.

The Protectors are admirably adapted for either the earliest or the latest crops of these. They will meet a pressing want that has long been felt by those who have to provide sweet, crisp, young carrots and turnips throughout the year. With present appliances, this, which is demanded in many families, is a work of the greatest difficulty. Carrots are more manageable than

turnips. By sowing late in the open ground, and in the autumn and again with the opening year in frames, a constant supply has with considerable difficulty been maintained ; but even then the frame carrots are often exhausted before the first crops outside are fit for use. Now by sowing in these Protectors every month, from September to March, a continuous supply would be ensured. Simultaneously with the last sown in the Protectors, the first sown should be made in the warmest sheltered spot out of doors, and the one crop would come in just as the other was exhausted. Beyond this period successional crops in the open air are simple enough. A similar course might be pursued with turnips. These are, however, more difficult to manage, as they dislike a confined atmosphere, or much warmth, and resent it by trotting off the course that leads to the winning post of succulent bulbs, and dashing into the useless region of gaudy flowers. Still, with extra care, although turnips will hardly bear any forcing in the ordinary sense of the term, they may be led gently forward in these Protectors until our object—tiny, crisp, sweet bulbs—are obtained. To secure this gratifying result, however, great caution will be needed. The turnips must not be exposed to any sudden changes, neither of the amount of heat nor of moisture in the air. They should meet with no severe checks to their growth nor undue strains upon their vital energies. They demand, above most plants, a gentle regimen, being constantly led in the way they should go, rather than driven in accordance with the cook's impulsive desires. Such being the fickleness of the young turnips, these Protectors supply the missing link in our present appliances for their successful growth. Delivered at once from the forcing atmosphere of an ordinary dung-bed, and the harsh biting grasp of the outside air, they will thus meet with a happy medium between the two, which will nurture their healthy growth.

A good deal of the success with either carrots or turnips will depend upon a wise selection of varieties. Those with the smallest tops should invariably be chosen. The tops may also be reduced with advantage.

In the limited space of these Protectors the bottom leaves may often be removed without injury. A secret may also be revealed here that must not go further than the grower : white turnip-radishes grown to a good size may often be made to pass muster for the first crop of turnips. As they enlarge in bulk they grow in mildness and sweetness, and they have often been eaten and enjoyed by epicures without discovery. The advantages of the substitution are many. They grow to maturity so much quicker, and their tops being so much smaller, many more can be grown in a limited space.

For turnips proper, perhaps no better varieties could be selected than the following : White and yellow Maltese ; red Dutch, very early ; Six Weeks ; Snowball. Carrots : Early Horn and the short French are the best.

RADISHES.

The usefulness of this invention for the production of early and late radishes must be obvious at a glance, and need not be further insisted upon. The culture is more simple than, though similar to, that of carrots or turnips.

CELERY.

Their relation to the culture of celery is almost equally obvious. They can be used for bringing on the young plants, protecting early-planted out crops in the ridges, and preserving the latest crops from the destructive effects of frosts, rains, and snows throughout the winter. It is not too much to say that half of the late celery crops are destroyed by these agencies, and frequently almost the entire crops are converted into masses of rottenness. By covering them with any of the simplest and cheapest forms of these Protectors, they might be preserved in perfect safety all through the winter and spring. Their use early in the season

would enable the first crop to be planted out in April, and this would give a clear gain of a month. With such power of forwarding and preserving this most useful vegetable as these Protectors provide us with, the luxury of good celery would become almost a constant one, instead of being fitful and, to a great extent, accidental, as at present.

ASPARAGUS.

By a special mode of planting, these Protectors would prove the simplest of asparagus forcers. Strong crowns should be planted on the centre of a narrow ridge in single rows, almost touching each other, and a yard from row to row. The space between should be sunk to a depth of say two feet. Place the Protectors along the centre of the rows from November to February, in regular succession, at intervals of a fortnight. Then fill up the alleys between with a mixture of fermenting leaves, and dung up to the level of the glass-slide that forms their top. This manure will provide the two sources of heat required to force the asparagus. The portion beneath the ground-level will stimulate the roots; that above it will warm the atmosphere and draw up the tops. By the use of glass the heat of the sun will likewise assist in this latter object. It will be observed that the warm dung in this arrangement will reach quite up to the level of the glass. Thus a mass of fermenting material, a yard in depth, will be secured. This will be massive enough to give out sufficient heat for our purpose. In fact, if the manure is rank, caution must be exercised against an excess of heat. A thermometer plunged into the mass should never exceed 75° or 80° of Fahr.; 70° would be a good medium to aim at. During very frosty weather nothing could be easier than to cover the glass with straw; or, if the asparagus were not objected to in a white state, the glass for this purpose might be altogether dispensed with, and a board or slate top substituted for it. These opaque tops could then be covered over with hot fermenting material to the depth of a foot;

this arrangement would induce a more rapid growth. And it is still a disputed point with connoisseurs whether there is any perceptible difference in the flavour of white and green asparagus. Green is, however, the more natural looking, is generally preferred, and is the normal colour of the asparagus gathered from these Protectors, when allowed to remain in their usual state, that is, with one side transparent.

By this mode of thick planting and liberal cultivation, it is astonishing how much grass of the highest quality can be cut from a single line. And no better or cheaper method of enjoying the luxury of this choice vegetable throughout the winter or spring months has ever been laid before the public than that now advanced in connexion with this new and patent invention.

When the Protectors are withdrawn from the early crops, the roots and crowns must be carefully covered over with long litter to keep out the cold, as they would be easily injured in that state of excitement. Towards the end of April all this covering should be removed, and the fermenting material entirely cleared away. Upon removing it, the roots may be found to have penetrated the bottom layer; part of this must therefore be left, and covered over with a dressing of strong well-rotted cow or horse manure. The centre of the row should receive a similar dressing. By top-dressing both, and from the natural tendency of the crowns to elevate themselves, the same relative depth from the crown of the row to the bottom of the alley will still be maintained. The plants may receive two slight dressings of salt and several soakings of liquid manure during the summer, and be kept free of weeds, and the tops kept from breaking by running strong cords along each side of the row.

With such liberal culture, they may be forced every year, or allowed to rest each alternate season. If the latter plan is adopted, none must be cut from them in the open, but every stem left to form the leaves of a monster crown for the Protector to develop into a sweet morsel the succeeding year.

PARSLEY.

A few of these Protectors placed over some strong parsley in the autumn will ensure a plentiful supply, fresh and green, for garnishing throughout the severest winters.

SALADING.

This Patent Protector will enable British growers to compete with, and probably beat, the Parisians on their own chosen ground. Certainly, at present, the continentalists beat us in the matter of salads. Doubtless their climate is better, but their skill is also greater, and their appliances more numerous. The amount of excellent salading consumed in Paris is enormous. It is not looked upon as the luxury of any class, but as a necessity for all; and this not only in summer, but throughout the winter and early spring. Enormous lettuces are produced under green and other bell-glasses, of the sweetest, freshest, crispest quality, throughout the winter and spring months. Endive, of the tenderest description, is enjoyed all the winter long. While, if either of these is in danger of failing, which they seldom are, great bowls of blanched chicory are ready either to add to them or become a substitute for them. Now, with the help of these Protectors, there is no reason why we should not grow all these as well or better than the Parisians. All that is needed is to plant some of the Protectors with approved sorts of lettuces every month, from August on to April, with nice plants, in a rich well-drained soil. These may be called the growing Protectors; and by a judicious use of sun-heat and surface covering, and by using litter up to the glass, in the same manner, although not to the same depth, as for asparagus, no obstacle can be presented to a healthy vigorous growth. During severe frosts or piercing winds, little or no air would be

needed. When warm weather came, the glasses would be partially or wholly withdrawn, the surface moved, cleaned, or top-dressed, the roots watered with tepid water, and the lettuces tied as they required.

Another set of Protectors might be termed the Preservers. During October, and in mild seasons even up to November, nice cabbage or cos lettuces, almost or quite ready for use, could be carefully moved with balls, and planted thickly in these Protectors. If the roots are at all dry, dip them in a thick puddle, formed of clay or cow-dung and water, remove every useless leaf, and pack the plants closely together, using a little dry earth over the surface as the process proceeds. Place the glasses on, and shade from the sun for a day or two; then give as much air as possible, but never allow the rain to fall upon the plants. Under such treatment, they will keep good and crisp for two or three months. Should they show symptoms of flagging, they must be watered carefully with the spout of a small bent watering pot, on the surface, without wetting the hearts or leaves, as the great evil to be guarded against is damp. The opposite extreme of dryness must likewise be avoided, or toughness and leatheriness will be the result.

Another class of Protectors may be designated the Blanchers. Into these endive of all kinds, and some sorts of lettuces, may be packed, in the same way as has just been described for the Preservers; only the Blanchers will need no light, therefore boards or slates may be used for tops instead of glass. It is, however, of the highest import that the coverings be waterproof. No rain must be permitted to drip through, as damp and darkness are the parents of decomposition and rottenness. It is not, however, necessary to transplant the crops for blanching; they may be grown in single, double, or treble lines, closely together, to suit the size of the Protectors. It will thus only be needful to place them over the plants, exclude the rain, and shut out the light, and the blanching and preserving functions of the Protectors will do all the rest. Used for chicory it will be better to grow the plants strongly in rows, fifteen inches apart and nine inches or a foot from

plant to plant. Take them up in October, cut off all the leaves without wounding the crown; then pack the roots closely in any light sandy soil in the Protector, cover them over, and place them on a dunghill, or put some fermenting material round them, and the plants will speedily push forth their pleasant, bitter, tender leaves. Several successive crops may be cut from one set of plants.

Varieties.—For the coldest winter work, perhaps no sorts equal the hardy Hammersmith Cabbage and the Brown or Bath Cos. The following would do well with more or less protection: Cabbage; Victoria, tender; Brown Dutch, hardy; Grand Admiral, ditto; White Summer, tender; and Neapolitan, tender, but very fine.

Cos lettuce, green and white Paris Cos, Improved Spotted Cos, and the Brown already named.

Endive: the Moss-leaved Curled is very dwarf, and the White Batavian, crisp and tender. Any of the French cutting lettuces, as they are called, that is, those that form no hearts, and can be cut at any period of their growth, may be used for early spring purposes. There are two or three sorts curled like endive, and one sort like an oak-leaf, that are crisp and tender. For small salading, such as common salad, mustard and cress, successions of herbs, such as chervil, purslane, pimpnel, small onions, &c., the resources of these Protectors are well-nigh inexhaustible. But enough has been written to prove how much they may contribute to the replenishment of a rich and savoury salad bowl as well as to the dinner that precedes it. Useful for the growth of fruit, they seem essential to the production of a constant supply of sweet and succulent vegetables.

SUMMER WORK FOR THE PROTECTORS.

It will be observed that hitherto work has been laid out for this most useful invention chiefly, if not wholly, throughout the late autumnal, winter, or spring months. To forward winter or spring crops, and shelter winter ones, have been represented as their chief merits; but these essential purposes by no means exhaust their uses. In many localities choice fruits will require their assistance throughout the summer, in others they may be dispensed with after the middle of May. Again, by keeping the vines as late as possible, many of the Protectors that have grown autumn or winter peas, beans, cauliflowers, or other vegetables, and protected celery, endive, lettuces, &c., will be relieved in time to be elevated to the higher mission of grape-growing; while if any are relieved too late for this purpose they need not remain idle for a single day. Some that have carried salad through the winter and spring will at once be needed in the celery trench, others will be required on the outside cucumber ridge, or to grow vegetable marrows. Again, they are just the very things to grow tomatoes, chilies, capsicums, and Cape gooseberries in. The light and heat they would place at the command of the cultivator would enable him to produce these crops at a time, and in a condition of perfection that is seldom seen. Kept thin and trained lengthways, there is hardly any limit to the quantity and excellence of such produce as might be gathered from these Protectors.

If any are left over from all these purposes, then dig out a drain-like space a yard deep and two feet wide, in a sunny position, fill it up within six inches of the surface with nice warm hotbed manure, tread it firmly down, and turn a thick turf of loam upside down on to the

top of the dung, add six inches of good loamy soil, on with the Protectors, and plant them with the best varieties of frame cucumbers and melons. If this is done in June, in ordinary seasons the results will be equal or superior to those obtained from dung-frames. The mode of training must, however, be different: the cordon system must be applied to the plants. One, or at the most two, shoots from each plant will suffice. For a Protector a yard long one plant should be planted in the middle; a shoot might then be trained to each end, and stopped when it reached them. About three fruit should be set on each side; thus six good melons would be cut from this limited area, a creditable feat in melon-growing. The size of the leaves would be an objection to many varieties of cucumbers. Those of medium size only, such as the Lord Kenyon or Sion House hybrids, should be grown, and if these are stopped at every leaf to develop fruit rather than foliage, space enough would be found for the production of abundance of fruit. Even pine-apples might be successfully grown in the open air with the help of these Protectors. Does the reader smile at the enthusiasm of the inventor? Is he aware that Mr. Barnes, of Bicton, in Devonshire, has ripened good pines in the open air without any protection whatever? And would not these Protectors diffuse a better than a Devonshire climate over the whole of Britain? The chief drawbacks to pine-growing in the open air in favoured localities are found to be heavy rains and the sudden changes of temperature. Such Protectors set both of these difficulties at defiance, and there is no reason, in the nature of the plants or the character of our climate, why good pines should not be produced in this manner.

The likeliest means of commanding success would be to plant or plunge out, in a prepared bed of hot manure, plants showing fruit in June; apply the Protectors and a forcing regimen at once, and the fruit would be ripened in September or October. With proper skill there could not be a doubt of a successful issue in favourable seasons. The plants, however, would require the largest-sized Protectors, and it is

not one of their primary uses to grow pine-apples in the open air in England. Still, where plants can be spared, and Protectors are idle, this mode of pine-growing is well worth a trial, and it might serve to develop a new merit in an invention which reaches over nearly the whole range of horticulture, without necessarily including that of pine-growing or other true tropical produce.



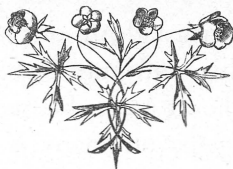
TOWN GARDENS.

It is impossible to over-estimate the advantages of these Protectors to amateur gardeners in towns. In oriental nations land has been held to possess such value as to have been formed—actually made—by art; and who has not heard of the famous hanging gardens of antiquity? Bare rocks have been covered with earth, and tier above tier of terraces were formed, manured, and matured, at an enormous expenditure of time, labour, and money. And yet the value of land in ancient times was as nothing to its price at the present day; in London and other large towns, as much as £100 per foot is often given for land. And as we cannot very well hang terraces on to the bare walls of our houses, it is the more necessary that every window-sill, and every inch of space on the leads provided with a clear sky-line, should be utilized. With the aid of these Protectors to imprison the erratic sunbeams, and turn their energy into a useful channel,—to shut out at once the cold, the fog, and the smuts,—there is no reason why the roofs of London and other large towns should not teem with vegetable life, and contribute to the food, comfort, and enjoyment of their inhabitants. The available area provided in gutters, on parapets, roofs, window-sills, landings, and other flat surfaces, is immense, and, if only skilfully utilized, a rich harvest of beauty and utility may be garnered. There would be little difficulty in so combining cultural skill with this useful invention as to enable every man to grow a portion of his dessert on his own house-top, and thus literally help him, not only to *sit*, but to eat, work, sleep, and enjoy life “under his own vine and fig-tree;” for, doubtless, even Grape-vines, Figs,

Cordon Apples, Pears, Cherries, Plums, and, in fact, all fruits, could be grown on the tops of houses, or the sides, with the aid of these Protectors. They could easily be made of sufficient capacity to hold the needful soil, or the earth could be deposited in large pots, tubs, or boxes, in out-of-the-way nooks and corners, and the tops of the plants be enclosed for a season, or permanently, within the area of the glass tops. Lines of these could be laid in any desired direction—straight up and down or diagonally across roofs, along the tops of parapets or the sides of gutters, or they might even be suspended from the side walls of dwelling-houses.

Many vegetables, such as Salading, Dwarf Potatoes, Kidney Beans, and Peas, or that superb vegetable, combining in the strongest manner those two great characteristics, utility and beauty, the Scarlet-runner—the connecting link between vegetables and flowers—that provides us with both in the highest perfection, could ramble about over and among roofs at its own sweet will, furnishing us at the same time with flowers of rare beauty for our vases, and a dish of the sweetest vegetable for dinner. With the Runners could be mixed and intimately blended Convolvuluses of deepest blue and purest white, trailing Jasmines and Clematises, flowing loose; robust climbing Roses; Canary Creepers, of softest orange-dye, and fairy, fluffy, bird-like forms; and Sweet Peas, laden with richest perfumes. In other places, again, looking skyward, from all sorts of odd places, Mignonette might be grown to sweeten the smoke; bright glowing Stocks, to chase away its gloom; flaming Tulips, to irradiate with a gleam of fire the prevailing darkness; Crocuses, to cheer the lonely; and pure Snowdrops, to preach a sermon on the possibility of a pure heart and a blameless life amidst every form of external pollution. Again, on many a humble ledge, those old favourites, Anemones and Ranunculuses, could be grown. Violets, Pansies, and Primroses would bloom and speak of sweetness and suggest thought; and, in a word, nearly all those lovely forms and sweet scents could be enjoyed, amid tiles and chimney-pots, that sweeten

and enwreathe the earth. In our parks and squares, at our feet, far, far down below—from highest roof to deepest, darkest cellar—there is no standing or safe climbing place where these Protectors might not minister to our wants or increase and enlarge our pleasures. On the blackest roof they may grow Mustard and Cress, to refresh the toil-worn denizen of some wretched garret, or to comfort some weary or sick child with a sweet-scented Stock, or a sight of a pot of blue *Nemophila*, from which she might learn the beauty and glory of the opening heavens. Or they might carry down into some dark cellar, from which all other light is shut out, a few rays of heaven's sunshine, in the form of some simple or lovely plant; while, on the other hand, from the well-stocked cellars of the wealthy they might send up sweet crisp Salads and dishes of savoury Mushrooms to those who live in luxury and grandeur. Thus, everywhere upon and under the earth, and far away above it—in giddy garret and on highest tile-top,—and spanning all the distance between these different conditions, and, as it were, meeting and supplying a want common to them all,—these Protectors offer to men in every variety of physical, social, and moral state the means of promoting their happiness and augmenting their purest pleasures.



FLOWER GROWING IN THE PATENT PROTECTORS.

As plants must be procured before they can be grown, it will be well to start with a heated Protector, showing arrangements for the raising of seeds or propagation by cuttings and grafting. Fig. 16 shows such an one ready for immediate work. With the aid of a spirit or other lamp,

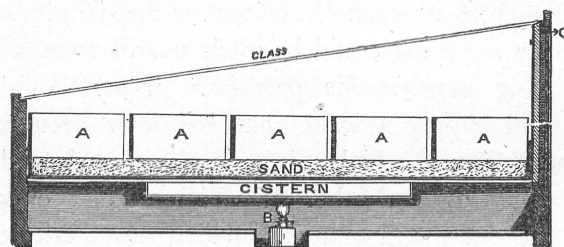


FIG. 16.

or jet of gas, placed under a cistern of water, the sand-bed is heated. A represents square pans filled with suitable soil for the reception of seeds or cuttings. The glass roof being placed on, one of the most compact and useful propagating places that has ever been invented is completed. Any seed may be raised, every cutting struck, in such a Protector as fig. 16. The very smallness of the area is an advantage for such purposes. Excellent cuttings are often withered up and destroyed from being exposed to too great a volume of air. This risk may be entirely avoided within the limited space of these useful Protectors. It would be well, where any great demand exists for plants, to have two or three of them heated. In places where as many as six heated Protectors were needed, a small furnace or boiler should take the place of the lamp or jet of gas. The whole of them might be

connected together by a series of air-drains or small hot-water pipes. Two or more should be heated, to give the plants raised a fair chance. They would then slide as it were, through a series of easy gradations, from the seed-bed to something very like the open air at its best. From the close heat of the propagating place to the coolest Protector, or the colder open air, would be too much of a change at one remove, and give the plants a violent check. Hence the necessity of intermediate temperatures; and these could hardly be obtained unless the cultivator were provided with several heated Protectors, in which the temperature could be controlled at pleasure.

While one or more of such Protectors as fig. 16 are essential to the amateur, scarcely anything could be more useful than a few of them in noblemen's or gentlemen's gardens. They would there be in constant use, and supply a want that has long been felt—that is, a small propagating house, which might readily be adapted to the wants of any little thing, one or other of which needs propagating almost every day in the year, and many of which get neglected because in themselves they are not thought to be worth subjecting a largish house to any special treatment wholly for them. But a miniature house of this kind would always be ready, or capable of being made so in a single hour. They would, for this very reason, be always in use; and in large gardens a dozen of them might be heated by a branch-pipe from a boiler near at hand without perceptibly swelling the coal-bill. The amateur, too, might manage, by placing those to be heated near his cottage, to warm them from the kitchen range or boiler at the back of his fire. And the poor man could readily convert a common pot into a boiler, by inserting a flow-pipe near the top, and a return at the bottom. By placing it somewhere at the back or side of the grate, and taking care that it was constantly replenished with water, heat enough would be generated without further trouble or expense; and in many neighbourhoods, too, the hot water and waste steam of manufactories could be turned to immediate account

(see page 72). Of course, these modes of economizing existing sources of warmth are not advanced because there is any difficulty in applying heat directly to the Protectors, but solely to save expense, as nothing can be simpler than the mode of heating exhibited in the woodcut, in which a boiler or a hot-air furnace of any power might be substituted for the lamp or jet of gas.

To the amateur, mechanic, or labourer, such a heated Protector would prove invaluable. It would not only raise all his tender seeds and choice plants for his garden, but force spring flowers or bulbs, grow small salading in winter, grapes, cucumbers, or melons in summer; preserve his sub-tropical plants to astound his neighbours with a richer grander growth the next season; and grow violets, mignonette, or other sweet flowers, to the highest perfection through the dismal days of dreary winter. These heated Protectors will likewise enable any one to preserve such tender things as the *Iresine Herbstii* and the various *Coleus*. The Tricolor, Bronze, and other choice *Pelargoniums*, also need a little artificial warmth during winter, not only to enable them to pass safely through its pinching cold, but to encourage growth enough to ensure several successional crops of cuttings in the spring. It thus appears that the heated Protectors will have a manifold mission in relation to flowers. They will raise seeds, strike cuttings, preserve and grow tender plants, and flower hardy ones, in and out of season. In other words, they will increase our stock, preserve it from harm, and develop its beauty. A few remarks on each of these heads will best illustrate the value of the invention.

STOCK

Such as is under consideration here may be said to be increased in three ways—by stimulating old plants, by rooting the young wood, and by raising plants from seeds. *Dahlia* and *Salvia patens* roots afford a good illustration of the former process. Supposing each pan in figure 14 filled with a particular dahlia, or with the salvias, plunged in the

sand and the heat applied, the tubers would start almost immediately into growth. This young wood would thrive best in a temperature of 60° . The object should be to develop as many strong shoots as possible to a length of six inches. When they grow to this length they should be cut off. Should a great many be needed, the shoots should be removed a joint or two above the tuber. From each eye left another shoot will speedily spring forth, and four shoots will shortly be produced where the one was before. An eye may again be left on each of these, and eight shoots would be secured at the second cutting down. By starting the tubers early, and leaving an eye each time, there is hardly any limit to the number of cuttings that may be ultimately made from a single root. Plants not bulbous are treated in a very similar manner. Supposing, for instance, the amateur is desirous of multiplying to the utmost extent *Lady Cullum Pelargonium*, the plant may be plunged in the sand in a bottom-heat of 70° , and an air-temperature of 65° , in, say, the beginning of January. The young shoots will soon grow several inches. When they have formed four or five leaves, cut them off one or more eyes from the old wood. Continue the same forcing treatment, and two or three shoots will start forth from the base of each branch cut down. Encourage these on until they are long enough, then behead in the same manner, and so on in continuity. The treatment of *Verbenas*, *Iresine*, &c., &c., is even more simple. These grow much faster than *Pelargoniums*, and break away spontaneously at every eye.

So much for the stimulation of the old plants, the producers of the raw material of increase. But it will be observed that the shoots are only branches at present; they are not yet plants; they have yet to be perfected by the addition of roots. How are they to be furnished with these vital organs? Thus: Fill one of the pans half full of broken potsherds for drainage, place over that a layer of moss or cocoa-nut fibre refuse, then, say two or three inches of light sandy soil, and over all an inch or half inch of clean sharp silver sand; beat all firmly down, level it off, and water the surface smooth with water at a temperature

of 70°, through a rapid-running rose. Leave the pots to settle down for half an hour; then insert the cuttings about an inch or an inch and a half deep with a small dibble. If not skilful, only place the cuttings round the sides of the pot, as they root more readily there; but if skilful, place them all over the surface of the pot or pan. As to the distance from each other, it must be determined by our means and our wants; as a rule, the thinner the better the chance of success, as thickly-planted cuttings often rot and decompose each other. One inch apart for Verbenas, two for Dahlias, and one and a half for Pelargoniums, will prove safe distances.

See that, during the process of dibbling, the base of the cutting is made firm: this is the only point of vital importance, and, if it is not attended to, failure will follow. When the planting is finished, water the surface quite level with a finer rose, using water of the same high temperature. Leave the pots for ten minutes to settle the sand firmly down; then proceed to plunge the cutting-pots into the warm sand-bed, in the same way as the old plants.

All cuttings so far may be treated alike. But from this moment different classes of plants will require different treatment. The Dahlias and Verbenas represent classes that will not only bear, but root all the sooner, and grow all the faster by, being kept in a close moist atmosphere. They will at once begin to extend their tops and emit roots. With Pelargoniums it is widely different. They will not bear a very close stimulating regimen; a period of apparent stagnation comes to them. The elaborating functions of their leaves are arrested, their succulent stems become overgorged with water, and decay and death frequently claim them for their prey. The remedy is obvious. Plunge them in heat, but give plenty of air to the tops. Flagging, which would wither or dry up the vital sap of a Verbena or a Dahlia cutting, and destroy its life, becomes a useful means of emptying the fully-charged pelargonium-shoot of some of its superabundant juices. Therefore, although aeration must not be carried to excess, it is a necessary element

of success in the safe rooting of *Pelargonium* cuttings. Water must also be applied with caution, and the soil be kept rather dry than otherwise until roots begin to form. When this happens, the normal conditions of healthy life are restored, and the period of risk and danger that taxes, and often baffles, the skill of the tyro has passed over. The risks with such cuttings extend over the whole period of stagnation—that interregnum that comes to the branch of such like plants between its life of dependence on the parent and its independent existence on its own bottom. Such cuttings as *Iresines*, *Ageratums*, *Dahlias*, and *Verbenas* have no such stoppage between two lives, and hence they are much easier rooted, and will bear a closer treatment.

The raising of seeds is a much simpler operation. The pots or pans may be prepared exactly as for the cuttings, omitting the surfacing of sand. Then a universal rule, worth its weight in gold, in reference to depth, is to cover the seed over with soil just the depth of its own diameter. There is positively no exception to this rule; it is a golden one, applicable to every seed that *grows*; and the chief reason why so many seeds refuse to grow is that they are not sown in accordance with it. Many people, for instance, would sow *Lobelia speciosa* or *Calceolaria* seeds, which are like fine dust, and cover them as deeply as *Perilla* or *Aster* seeds, which are as large as *Mustard* and *Cress*. In fact, it is not at all certain that *Mignonette* is not sometimes sown as deeply as *Convolvulus*, and *Virginian Stocks* as *Canary Creepers* or *Sweet Peas*. Cover every seed sown in these Protectors with fine soil the depth of their own diameters, and, if the seed is good and the treatment wise, success is certain.

Seeds require but little care until they germinate. They must be kept in a medium state of moisture, neither too wet nor too dry, and in a temperature of from 60° to 70°. Even seeds of the hardier plants will not be weakened by this temperature, if it is reduced as soon as they have fairly germinated; and 65° is well adapted for the raising of *Perilla nankinensis*, all the *Lobelias*, *Ageratums*, *Amaranthuses*, *Cannas*,

Celosias, Cinerarias, Clianthuses, Clintonias, Cobæas, Cupheas, Daturas, Helichrysums, Heliotropiums, Hibiscus, Humeas, Ipomeas, Linums, Lophospermums, Mesembryanthemums, Tobaccos, Petunias, Phlox Drummondii, Portulacas, Castor-oil Plants, Solanums, Thunbergias, &c.; likewise the seeds of all stove and greenhouse plants; whereas other hardier seeds, such as Stocks, Asters, Marigolds, Tropæolums, Pentstemons, Primulas, Malvas, Dianthus, Delphiniums, &c., vegetate better in a temperature of 55°; while, as every one knows, immense quantities of seeds, such as Antirrhinums, Hollyhocks, Aquilegias, Calliopsis, Clarkias, Collinsias, Gilias, Gaillardias, Godetias, Nemophilas, Œnotheras, &c., come up best in the open air. With these, however, we are not concerned at present. Having raised our plants in the heated Protector, the first questions that suggest themselves to the grower concern their character and final destination. The answers to these questions will modify their mode of treatment. Should they be stove or greenhouse plants designed for growth in glass structures, the temperature and general treatment may proceed for a considerable period longer without material change. The same remark is applicable to what are termed sub-tropical plants, such as Cannas, Solanums, Castor-oil Plants, Paper Plants, Japanese Maize, Sugar-canes, Bamboos, Tobaccos, Palms, or Ferns. The great object with all these is to push them on as quickly as possible; they should be transplanted as soon as they will bear handling, plunged into a brisk bottom-heat, and subjected to a temperature of 70°. Unless such plants are tolerably well developed before their removal to the open ground, they will never make much way afterwards; consequently the powers of the Protectors must be fully expended in laying a strong solid foundation for future strength and beauty. Similar principles must control the treatment of all the plants that have been raised from seed or rooted in the heated Protectors, only they will be modified by the character of each particular plant. With most things, too, such as Dahlias, Verbenas, and Pælagoniums, the two processes of growing and hardening will proceed

simultaneously. It is scarcely more important that the plants should increase in size than that they should become inured to our climate; the treatment should be so nicely graduated that most of the inmates of the Protectors should be able to leave them for the outside beds during May without any violent check. But this gradual hardening off of our stock plants brings us to the second great function performed by these Protectors, viz., that of preserving plants from injury throughout the winter and early spring. With heat there can be no difficulty in keeping almost any plant through the winter in these useful Protectors. Even without heat, and with the help of the various coverings recommended in connexion with fruit and vegetable growing, many bedding plants, such as Verbenas, Calceolarias, and the hardier Pelargoniums, could be wintered in safety. Heated, of course all things become possible, and where many plants are needed several heated Protectors should be provided; the plants would then pass from the hottest, through all the intermediate stages, into the unheated, and from thence into the natural temperature. But it is just at this transitional period that the portability of these Protectors would endow them with a new power of rendering the cultivator the highest service: protecting the plants most efficiently through the winter, increasing and growing them throughout the spring, hardening them off gradually in the early summer, they are not compelled to desert them when they go to their permanent quarters in the open garden. These houses are so light and small that they may actually follow their inmates to their new homes outside; and it is no unusual occurrence for plants to need protection as much, or more, in the last cold days of May, or even the beginning of June, than at any other period of the year. And this brings us to our last point—the growth or development of the beauty of plants within the Protector. This is a wide field; but we will chiefly confine the inquiry here to what are popularly called Bedding Plants.

If such plants can be protected sufficiently in the open ground, the first great gain will be one of time; an earlier stronger growth will be

secured. The beds might be filled say a month sooner than they are now. Planting out could be completed by the beginning instead of the end of May. The plants would receive less check, as the Protectors would prevent the waste of power from excessive perspiration, and encourage an immediate advance movement. Another great advantage would be uniformity of growth. It would never be necessary to cover the whole of the plants, nor the entire garden. Calceolarias and Verbenas properly hardened off may generally be planted out early in May without risk of injury; but it is wholly different with such things as Iresines, Coleus, Aramanthus, and even Perillas, the hardiest of the four. All these very often go back, and not forward, after being planted out. And the same remark applies to the more delicate Pelargoniums.

Now supposing all the delicate things could be covered with some of the simplest forms of such Protectors for a month or so, the entire garden or ribbon border would show a uniformity and equality of growth that is seldom seen at all, and never until late in the autumn, under present arrangements. By covering the Coleus and Iresine with glass-tiles, they would keep pace with Calceolarias and Verbenas; and the whole design speedily and almost at once acquire the charm of a uniform, equally-balanced, regularly-furnished whole.

A third advantage arising from the use of these Protectors is, that they would place at the disposal of almost every grower a greater variety and a richer assortment of beauty. Many plants that can now only be successfully grown at Battersea and other sheltered places would, by their assistance, become the property and the pleasure of all. By adopting the system of placing a few spadefuls of hot fermenting dung under choice tropical plants, and sheltering them more or less till the middle of June, most of our Palms, Ferns, Dracænas, and Begonias might be used as choice stars for the centres of beds, or graceful furnishings for sheltered nooks on lawns or pleasure grounds. Large specimen Fuchsias, Oleanders, Hydrangeas, Myrtles, Pomegranates, and Daturas, could readily be grown in the same manner; and

doubtless a judicious selection and a wise application of such semi-tropical beauty, and choice, scarce, tender forms, would add a new and charming sense of variety, and throw an exotic prodigality of richness and grandeur over the quieter commoner features of our home landscapes.

By applying these Protectors in the autumn, all this exuberant beauty might be preserved several months longer. How frequently only one or two severe frosts come early in the season and lay all, or much, of our beauty low, and the fine weather follows for several months! These frosts generally give warning of their coming. Thus forewarned and forearmed, it would be easy to place a few Protectors of large size and moderate power over at least a portion of the tenderest occupants, or some of those proud starers that impart such grandeur and dignity to the scene. For the want of such contrivances these valuable plants are often destroyed, and the garden from henceforth shorn of its glory. It lingers out the remainder of its season in helpless mediocrity. The expense of procuring and the labour of applying the Protectors would be cheaply purchased by the pleasure of enjoying all the beauty and perfect symmetry of a glorious summer a month or two longer, and carrying most of its brightness further on into the gathering gloom of a dark and maybe dreary winter.

But all this does not by any means exhaust the floral capabilities of these Protectors. Fig. 13 is the representation of a Window-box for

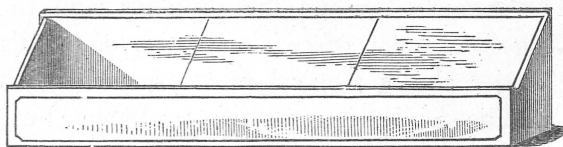


FIG. 13.

Stocks, Mignonette, and other flowers. Heated as shown in figure 14, it would be easy to have it full of flowering Tulips, Hyacinths, Nar-

cissuses, or Crocuses, soon after Christmas. Only heated by the sun's rays through the glass, similar bulbs could be had a little later in the season. Or Snowdrops, Aconites, and Christmas Roses could be had in full beauty to cheer the dark days of December.

And then, again, in the spring the sweet-scented Stocks and other plants would come in so very early; while all the best bedding plants might enwreath the window-case with a rich fringe of beauty before they could hardly start into growth in the open air. The sheltering warmth and the dazzling sunlight would bring out to the highest perfection the glorious tints of Tricolor and other Pelargoniums in such positions. Again—but it is needless enumerating the endless purposes to which these Protectors are applicable, for these are about as numerous as there are variations of climate, and plants to be grown. They will, for example, introduce a new era in bulb-growing. Many of our best Crocuses, for instance, can seldom be perfected in the open air in our climate. Nothing can be more brilliant than these glorious bulbs. Dense lines or masses of the common white, blue, and yellow are charming; but what would equally massive lines of White Mammoth, Queen Victoria, Caroline Chisholm, and Princess of Wales, or of purple or blue Ne Plus Ultra, David Rizzio, Perfection, and Brunette, and the new large Golden Yellow, be? or perfect masses or lines of such monster striped varieties as La Majestueuse, Sir W. Scott, Albion, and Princess Alexandra? But these, and others equally large and fine, can hardly withstand the harshness of our climate. The larger they are the more liable to injury from dashing rains, pelting hail-showers, and heavy snow-storms.

Provided with a sufficient number of glass-tiles, these fine Crocuses could be covered over in foul and freely exposed in fine weather, and hardly any plants could yield such a rich return of exquisite pleasure for the labour bestowed upon them. A similar mode of temporary protection could be applied to Tulips with equal ease, and even more brilliant results. Anemones, especially all the best double varieties, are

surely worthy of the same help to the unfolding and preservation of their rich and lasting beauty.

And as to Hyacinths, would not a ribbon border of red, white, blue, and yellow, be worth any labour and expense that could be expended upon it—to come upon it in the middle of April, perfect, compact, and regular in form; the colour endlessly varied, distinct, and pure; and the fragrance an indescribable blending of ravishing sweetness? To see it regularly displayed, tier above tier, on a raised bank slanting to the south, the back row flanked up with golden and white narcissus, resting upon a soft green cushion of a sweet-briar hedge, laden with its new-born leaves, and the red row in front relieved and toned down by a complementary band three cords deep of double white violet, or a wide braid of white Arabis,—a sight seldom seen, but to be treasured up in our heart of hearts for evermore. These Protectors bring such sights within the reach of all. Choose healthy bulbs of uniform size, plant early, and about six inches deep. Protect the ground from freezing until the bulbs appear. From that moment the Protectors must be judiciously used during harsh and ungenial weather; and thus may the great luxury of hyacinth ribbon borders or beds be enjoyed by every one.

Once more: these Protectors not only enable us to grow bulbs and other plants in greater perfection, and to cultivate a class of plants that our climate could not otherwise produce, but they likewise forward our hardy plants and cause them to flower at a much earlier period. They utilize the heat and light of the sun to the utmost, and draw from this cheap source a powerful stimulant to vegetable life during the dead season of the year. By placing a Protector over a bank of violets in mid-winter, they at once begin to yield up their beauty and sweetness. It is the same with a patch of Primroses, the lovely *Myosotis alpestris*, *Arabis alpina*, *Aubrietias*, *Anemones*, Christmas Roses, *Hepaticas*, *Auriculas*, &c. By cultivating these or any spring plants, or annuals, such as *Nemophilas*, *Limnanthes*, *Virginian* or *Brompton Stocks*, or *Wall-flowers* in beds the size of the Protectors, they may be covered over,

and drawn forward into flower, at almost any time during the winter. Shelter and sun-heat concentrated within a narrow area, and the use of tepid water applied to the soil, will exert a powerful forwarding force upon all such flowers. Many bulbs too, such as Cyclamens, Lachenalias, and the hundred varieties of Amaryllids and Lilies that are too tender to be grown wholly out of doors, could be cultivated most successfully in the open by the shelter that this invention affords. All the Japanese Lilies, and the glorious Auratum, might thus be transferred to the flower garden during the height of the summer season, where they would add a wealth of rich beauty and display a splendour of dazzling glory to which the best gardens are yet strangers.

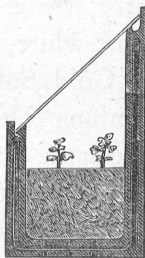


FIG. 18.

Choice Palms, New Zealand and other Tree-ferns, Myrtles, Camellias, Cytisuses, Coronillas, and even the hardier Cape Heaths, Indian Azaleas, and Rhododendrons of the tender or Arborea kind, could be preserved throughout the winter with large Protectors, manufactured with hollow sides, and double glazed; the interstices between the two edges to be stuffed full of straw, shavings, or other non-conducting refuse, in a perfectly dry state. Such plants, again, as the whole of the Magnolias could be placed or bent down into Protectors, as shown in fig. 12. These are designed to cover standard plants of *Magnolia grandiflora* and such like noble trees. Nothing could equal in rich exotic effect the glossy shining green leaves of this noble tree, laden with its large silver cups of purity and fragrance. With Rhododen-

dron arborea as a companion plant, and its enormous clusters of dazzling scarlet, we should have some of the richest charms of a tropical vegetation in the open air in England. The Rhododendron would need retarding as much as possible, or it would come into blossom at a time when it would need the full assistance of the Protector, and thus its beauty could not be fully displayed. On the contrary, the Magnolia would not flower until the summer, when it would enjoy our fine climate in the form of a standard, with all trace of protection removed.

All the best Tea Roses could readily be grown either in masses or as single specimens, as dwarfs or standards, and flowered to perfection, in the northern parts of the country, where they will hardly live at present. Or strong flowering shoots of the white, yellow, or Fortune's Banksian Roses, or such Teas as Cloth of Gold, Solfaterre, Adam, Maréchal Niel, Gloire de Dijon, and the Climbing Devoniensis, could be placed in these Protectors on walls, in the same manner as already described for grape-vines or cordon peaches, and the flowering season advanced by six weeks or two months. Nothing could be of more service than such a simple means of filling up the gap that is too often left between the grand display of forced roses and the rich harvest of blossom that awaits us in the open air.

And thus this invention will work on to perpetuate an unbroken continuity of loveliness, enabling us to anticipate the freshness and purity of the new-born spring, to enrich the dazzling beauty of the jewelled summer, and to carry most of its glory safely through the mellowing season of full-lapped but fading autumn; while they will also help us to light up the dark gloom of winter itself with the charm of ever-blooming flowers, and to temper its harshness with the soft perfumed sweetness of a new and tender life. And thus, at every season of the year, and all the year round, these patent Protectors will lay new pleasures at our feet, and open up to us perennial and inexhaustible sources of beauty, happiness, and sweetness. They will augment our supplies of

food, enrich the dessert, gratify the eye, educate and refine the taste, and open up freely to all one of the most delightful and gratifying sources of innocent and instructive amusement and relaxation, alike suitable for the play-hours of the sons and daughters of toil, and the leisure of the philosopher, the man of science, the literary student, the learned divine, or the statesman, and, in fine, open up freely to all one of the most delightful and gratifying sources of innocent and instructive amusement and relaxation, alike suitable for the play-hours of the sons and daughters of toil and the learned leisure of the philosopher, the man of science, the literary student, the divine, or the statesman.

THE END.

WASTE STEAM AND HOT WATER FROM MANUFACTORIES.

In several large Factories in the Provinces the Waste Steam and Hot Water that passes off from the works can be utilized. By very simple contrivances it can be made to supply heat to the Vineyards. Grapes can be forced, and be produced every day and all the year round, at almost a nominal cost. The Patentee will be glad to treat with the Owners and Proprietors of Steam Mills and Manufactories for the use of the Waste Steam and Hot Water, or he would enter into an arrangement for forming and conducting Vineyards for a share of the Profits.

RAILWAY EMBANKMENTS.

A great many Railway Embankments in the Southern and Western Counties could be turned to much account by being formed into Vineyards, especially those with a gentle inclination to the South. The Tubes can be supplied on the lowest terms, as they can be made at the nearest Pottery. The Patentee will be glad to enter into arrangements with the Directors of Railway Companies for the formation and working of Vineyards for a share of the Profits.

ENGLISH VINEYARD ASSOCIATION, LIMITED,

To be Incorporated under the Companies Acts, 1862 and 1867.

CAPITAL, £10,000, IN 2,000 SHARES OF £5 EACH.

Deposit, £1 per Share; on Allotment, £1 per Share. Calls at Intervals of
not less than Six Months.

Shares may be PAID up in full, and be made PAYABLE TO BEARER, without
any further liability of any kind.

MANAGING DIRECTOR.

MR. WM. EDGCUMBE RENDLE,

The Inventor of the Patent Fruit-tree and Plant Protectors, &c., &c.

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68, WELBECK STREET, CAVENDISH SQUARE, W.

SECRETARY.

MR. THOMAS GABRIEL.

THIS Company is formed for the purpose of establishing a Vineyard
and Fruit Farm on the new system just introduced by Mr. WILLIAM
EDGCUMBE RENDLE, and for selling the produce of the same.

It is proposed to purchase or rent a small farm in one of the
Southern Counties, and to cultivate Vines or Fruit-trees on a large
scale, with the aid of the New Patent Protectors.

Large fortunes have been made by fruit-growers by ordinary methods, and it is confidently expected that very large dividends will be realized on the capital proposed to be raised.

Mr. RENDLE has undertaken to allow the Association to have the use of his Patent, without any royalty, for 400 paid-up Shares; and he has consented to be Managing Director, and will only be paid his travelling and other expenses *until a dividend at the rate of 15 per cent. is paid*, and on the understanding that he is to receive one-half of the profits after payment of this amount to the Shareholders.

This is the best evidence that can be given of the Patentee's faith in the Invention, as he will receive scarcely any emolument until the Shareholders, who provide the capital, shall have received 15 per cent. dividend.

All Shareholders of 10 Shares and upwards will be entitled to have all their fruit, plants, &c., at the cost price, and will also be entitled to purchase the Protectors for their own private use at a reduction of 25 per cent. off the tariff price.

There will be no promotion money, and the preliminary expenses will not exceed £50.

The Company will be managed by the Patentee, under the control of a Finance Committee, to be appointed at the first meeting of the Shareholders.

The Auditors will also be appointed by the Shareholders, and it is proposed that they shall be professional accountants representing some established firm of high standing.

The Association will be worked as economically as a private firm, without the usual heavy expenses of management.

In the event of no allotment being made, the deposits will be returned in full.

All paid-up Shares can be made payable to Bearer, under the recent Joint-Stock Companies Act, 1867, so that there cannot be any further liability of any kind.

THE PATENT FRUIT-TREE AND PLANT PROTECTORS.



The Patentee is now making arrangements for the immediate delivery of the most useful descriptions.

Tile Engines, with the necessary patterns and dies, are being constructed, so that large numbers will soon be ready.

The prices will be very moderate, varying from One Shilling to Three Shillings per running foot, including Tiles, Glass, Wire-rope, &c., &c.

Agents will be appointed throughout the Country. - Application should be made without delay.

In laying out Vineyards or large Vineries, experienced Workmen will be sent to superintend the work if desired.

Orders can be forwarded at once, and will be executed in strict rotation.

For further particulars, apply to the Patentee,

Mr. W. E. RENDLE,

68, WELBECK STREET,

CAVENDISH SQUARE,

LONDON, W

ENGLISH VINEYARD ASSOCIATION.

It is proposed to establish a small private Company, with limited liability, to form a Vineyard and general Vinery on MR. RENDLE'S new Patent System.

The profits are calculated to be very large, and it is believed that the whole of the first outlay will be defrayed within two years, and that a dividend of from 15 to 20 per cent. may be fairly expected.

The profits of Ordinary fruit-growing are enormous, and large fortunes have been made.

Further particulars will be announced in a prospectus, copies of which can be obtained of

MR. THOMAS GABRIEL,

Secretary to the Association,

68, WELBECK STREET,

CAVENDISH SQUARE,

LONDON, W.

ENGLISH VINEYARD ASSOCIATION

It is proposed to establish a small private
company with limited liability to work a vine-
yard and general vine on Mr. WENDELL
new Patent System.

The profits are calculated to be very large
and it is believed that the whole of the first
year will be a large payment to the
shareholders of from 15 to 20 per cent.

The profits of ordinary vine growing are
considered small and have been much

reduced by the introduction of the new system.

MR. THOMAS GARNETT

OF ST. MARK'S STREET

ST. MARK'S STREET

ST. MARK'S STREET

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